

Ayitic Goes Global

Evaluation Report for Training Round 1

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1. Executive Summary

Ayitic Goes Global Program is a two-year partnership with the Latin America and Caribbean Network Information Centre (LACNIC), International Development Research Centre (IDRC), Ecole Supérieure D'Informatique d'Haiti (ESIH), Caribbean Open Institute (COI), 3x3 Design and the Slashroots Foundations. The program aims to enhance Haitian participation in the global economy through creating enabling conditions for Haitian female youth to find employment in the digital economy by addressing skills and infrastructure deficits in Haiti. The research and program design were implemented between April and February 2017. The first training round 1 was delivered between March 2018 and September 2018 whereby evaluation was conducted to study the factors that affect the successful completion of the program and monitor the performance of different implementation stakeholders.

I. Training Round 1 Cohort

The AGG program graduated its first cohort in September 2018. The cohort was comprised of fifty ICT professionals enrolled in the Network Management and Security course and fifty Girls enrolled in the Internet and Data practitioner course. The average age of the Girls was 24 and ICT pros was 28. A small percentage of both the groups were married and had children. Majority of the Girls were either pursuing or had received higher education. Detailed information can be found in the baseline report.

Figure – Snapshot of the 2018 Internet and Data Practitioner cohort [Source: Online Application Form from ESIH]

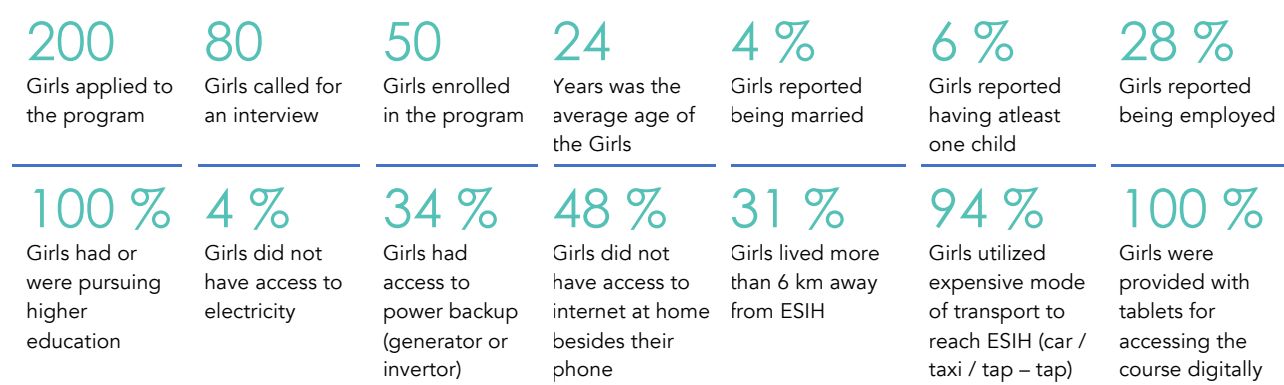
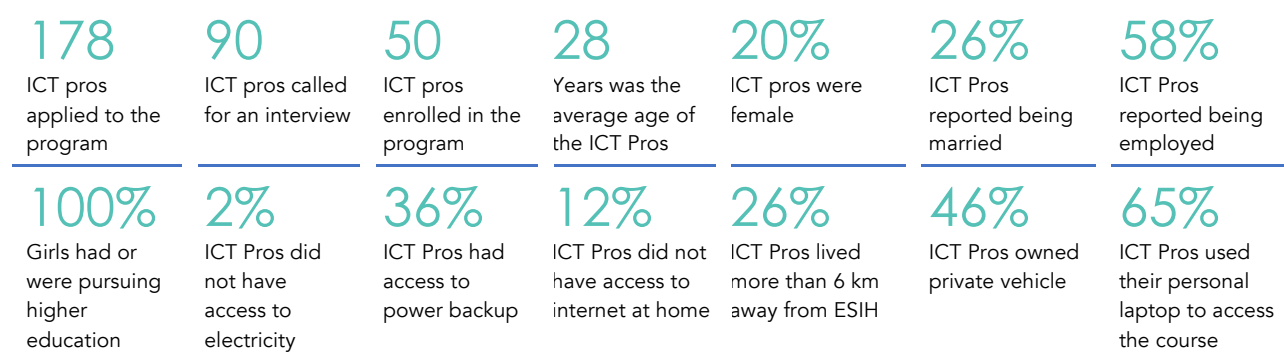


Figure – Snapshot of the 2018 ICT Professionals cohort [Source: Online Application Form from ESIH]



II. Evaluation Context

The evaluation included data collection activities at the start of the training, mid-point of the training, and end of the training to garner feedback and information from the trainees, trainers, and program partners. A mixed-method approach was employed using multiple data sources, including data from document review, selection and exit interviews with participants, focus group discussions, and surveys. Detailed information on the evaluation design methodology is provided in the Appendix.

The timeline of data collection activities and description of the data collection methods used in this evaluation follow:

Onset of the Training Round 1	Mid-Point of the Training Round 1	End of the Training Round 1
1. Online Application 2. Screening Interviews 3. Baseline Reports from the Partners	1. Course Assessment Survey 2. Program Assessment Focus Group with the trainees 3. Mid-Term Reports from the Partners	1. Course Assessment Survey 2. Program Assessment Focus Group with the trainees 3. End-Term Reports from the Partners 4. Program Assessment Interviews with the trainees 5. Program Assessment Interviews with the trainers

III. Main Findings

The main takeaways outlined below pertain to the program's impact and factors affecting the performance of the students who participated in the program and are detailed within this report with supporting evidence.

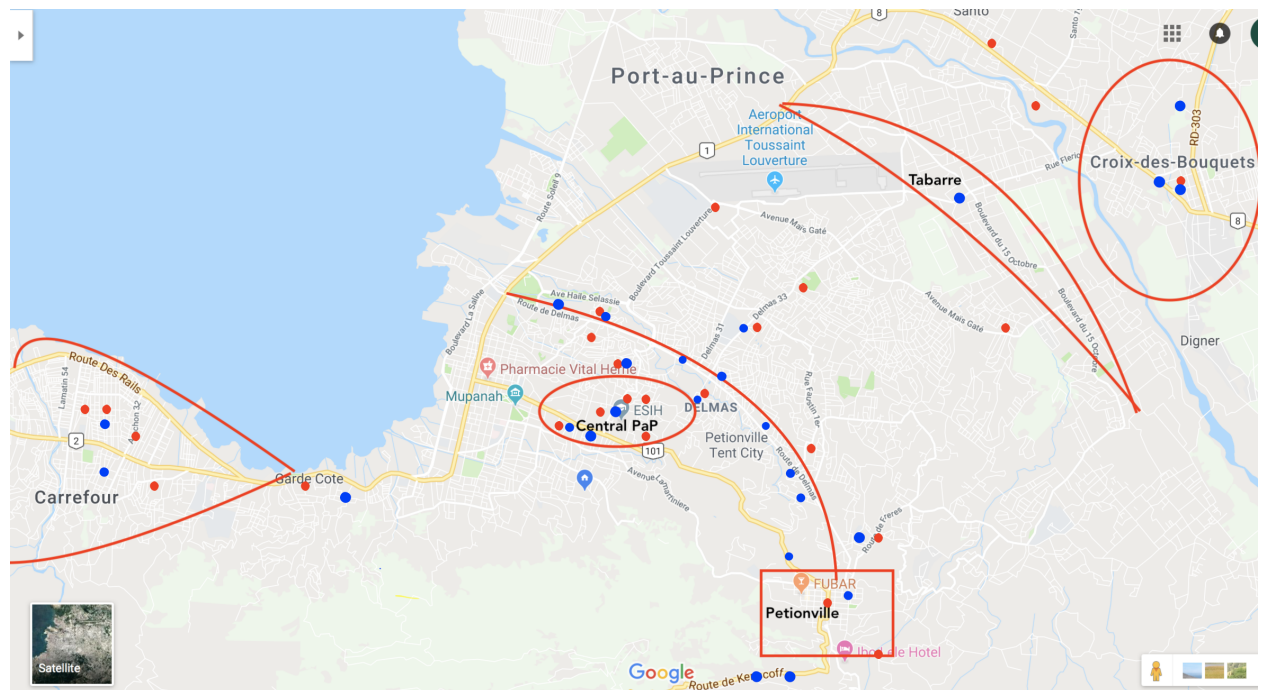
Socio-Cultural Factors

- Time Spent: Most students, both Girls and ICT professionals, received support from their families but life issues such as a sick elderly at home or care of child often affected the performance of the students negatively. Motivation and more one-to-one support played a huge role. Time management also played a large role in dealing with coursework and family-related work. The female ICT professionals bore greater burden of domestic responsibility (at least an average of 1 hour greater than male ICT professionals everyday as reported in the baseline data) and had a significant implication for women's ability to take actively take part in online courses. Overall, it was evident that while with female students the time management was related to the need to offload some of the household responsibilities, with male students it was the triple role of family man, working man, and a student that was difficult.
- Financial Constraints: Financial background was seen most linked with access to transportation specifically ownership of private vehicle. There was also an indication that higher the income, lower the performance, because of more time spent on work than on the course. Provision of tablet and lack of requirement to travel daily to ESIH played a huge role and made it feasible for Girls to successfully complete the program.
- Baseline Capabilities: Grasp of French and English language and basic ability use smartphones and had more effect on the Girls' performance than the baseline knowledge of software. Most students who self-rated themselves higher on decisiveness, self-motivation, openness to learning, integrity and reliability performed better. There was no discernible relation seen with the baseline skills of ICT professionals except prior knowledge of DNS.

Infrastructural Factors

- Internet Connectivity: Limited Bandwidth was amongst the biggest barrier that dissuaded, constrained or obstructed the student's meaningful participation in the online course. The issue of limited bandwidth capacity had more impact than internet access on the experience of Girls (45.83 percent) than the ICT professionals (19 percent). The Girls had challenges with downloading course content and engaging in quizzes and educational materials available in a video format. They also spent more hours than anticipated because of low internet speed often causing frustration and fatigue. With ICT professionals, the challenge of internet access was related less with the bandwidth capacity and more with the quality of the connection. Weak WIFI signals at certain geographical locations prevented the students from accessing course materials while at home or work.
- Electrical Power Supply: Frequent power cuts were a significant barrier that constrained access to the course materials and practice. The students need the power to run and charge technological devices and the lack of reliable electrical power supply presented an obstacle to access the course materials and quizzes. Frequent power cuts and unreliable supply affected the use of technological devices even when the students ensured that the tablets were charged. The lack of 24x7 electricity supply also affected the experience of the ICT professionals.
- Transportation Barriers: The challenge of transportation was closely tied to financial constraints for Girls. Each travel was an investment and required significant changes in their spending habits to meet the expense. It has less bearing on the performance of the ICT professionals who only had to visit ESIH for final exams.

Figure - Location of students (Girls – Red Color and ICT professionals – Blue color) in Port-au-Prince Area
[Source: Online Application]



- Access to digital device: Despite the ability to work on the course on smart phones, access to other digital devices was determined to be an important factor. Provision of tablet to the Girls overcame the barrier of

access to digital device for Girls. Ownership of digital device was much less amongst Female ICT professionals than male.

Pedagogical Factors

- Course Learning and Facilitation: Course delivery was designed to facilitate in-person interactions at key points in the learning pathway so as to sustain high student engagement. It was aimed that the student / instructor instruction within the online learning space would employ both asynchronous techniques (e.g. notes or video and/or voice recordings of key learnings) as well as synchronous techniques (chat and/or real-time forums) to ensure the most effective learning experience.
 - Access to Facilitators, Girls: Course learning and facilitation support was the biggest factor influencing Girls' experience and successful completion of the course. There was an overwhelmingly positive response towards the patience, availability, and dedication of the facilitators. Girls were inspired by the facilitators and perceived them as mentors.
 - Access to Facilitators, ICT Professionals: Most experiences of the ICT professionals with the facilitators were positive but there was a somewhat neutral response on the effectiveness of the facilitation support. Unfortunately, the lack of in-person sessions with the facilitators left some ICT professionals dissatisfied despite the constant availability of the facilitators. Students indicated a need for practice sessions and in-person discussions, so they could simultaneously learn both from the facilitators and the peers and benefit from group discussions.
 - Communication Channels, Girls: Girls preferred the widely popular and easily usable WhatsApp channel over the unfamiliar Slack channel for interactions with the facilitator. But towards the end of the course, most students shifted to Slack and recognized the benefits of a more professional interface.

Figure - Communication preferences of Girls (Source: End Term Evaluation Survey)

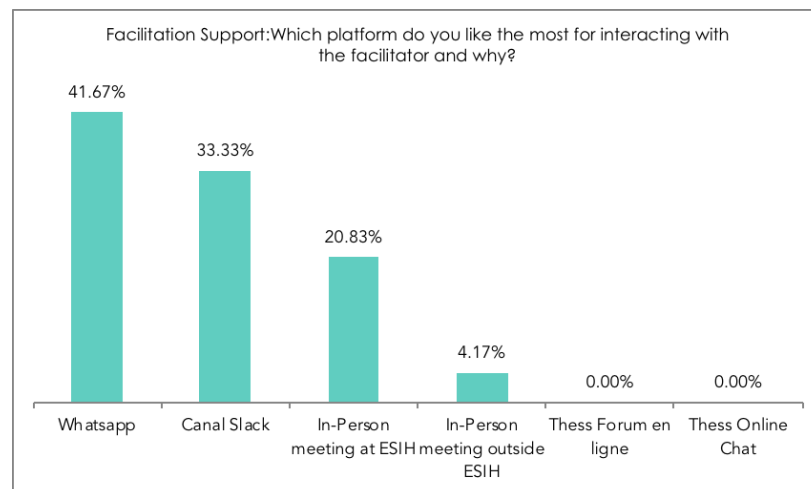
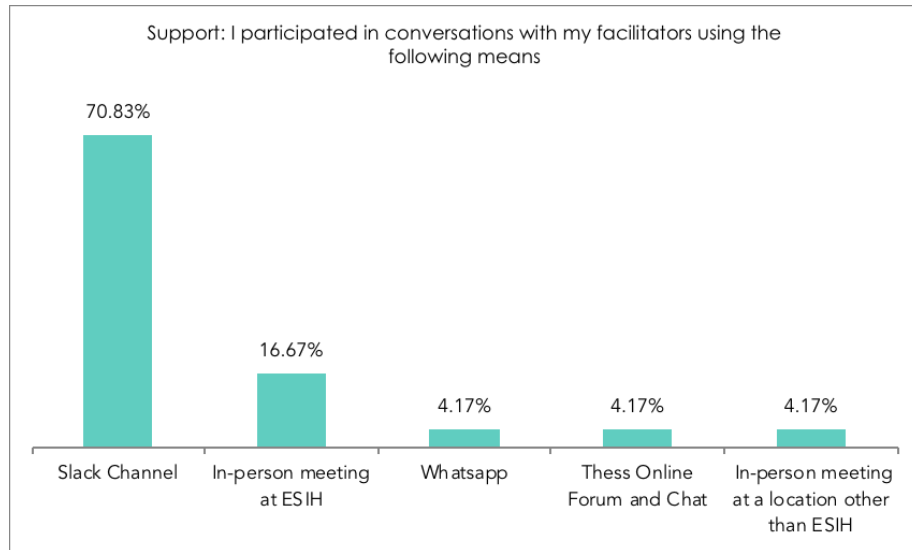
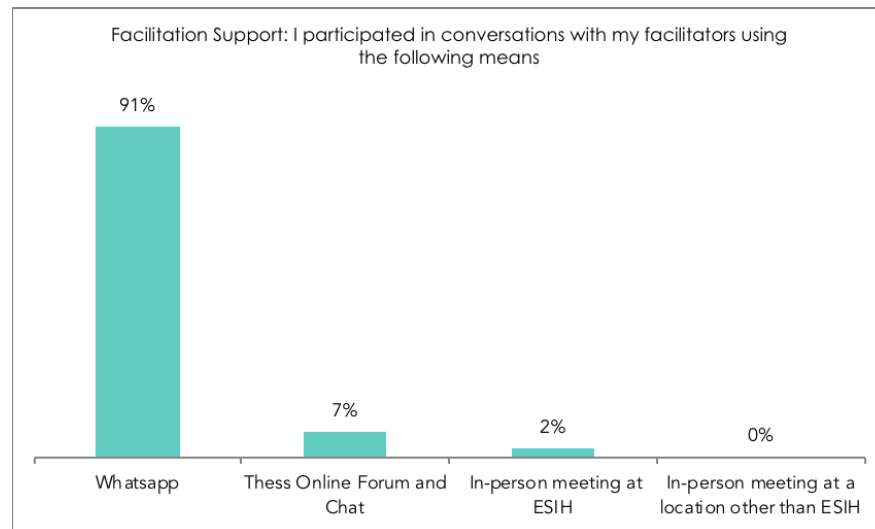


Figure - Communication channel used by Girls to interact with facilitators (Source: End Term Evaluation Survey)



- Communication Channels, ICT Professionals: ICT professionals were unable to adopt Thess forum for communication with the facilitators and naturally inclined towards WhatsApp in the absence of other more professional communication technologies.

Figure - Communication channel used by ICT professionals to interact with facilitators (Source: End Term Evaluation Survey)



- Peer Learning: The research conducted for program design had recommended encouraging student collaboration program through dynamic activities including group work and team sprints to facilitate peer learning and development of cognitive and social skills.
 - Peer Support and learning: Students sought moral support from their peers and helped each other to improve comprehension of the course content. Girls reported that peer learning improved their

understanding of the course. Some students supported their peers by explaining what their peers cannot understand or know nothing about. There was also a sense of kinship among the Girls. ICT professionals sought for moral support from their peers first and foremost. Other students reported receiving help to understand the course content and quizzes better.

Figure - Influence of peer learning on Girls (Source: End Term Evaluation Survey)

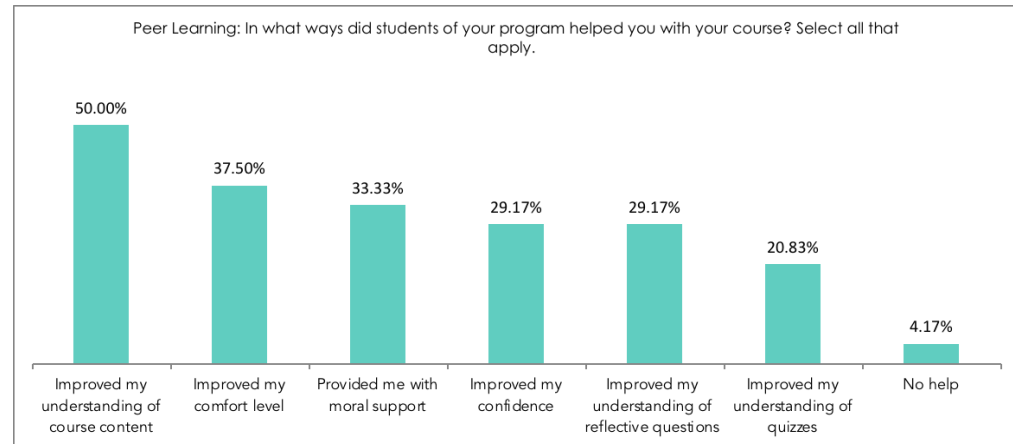
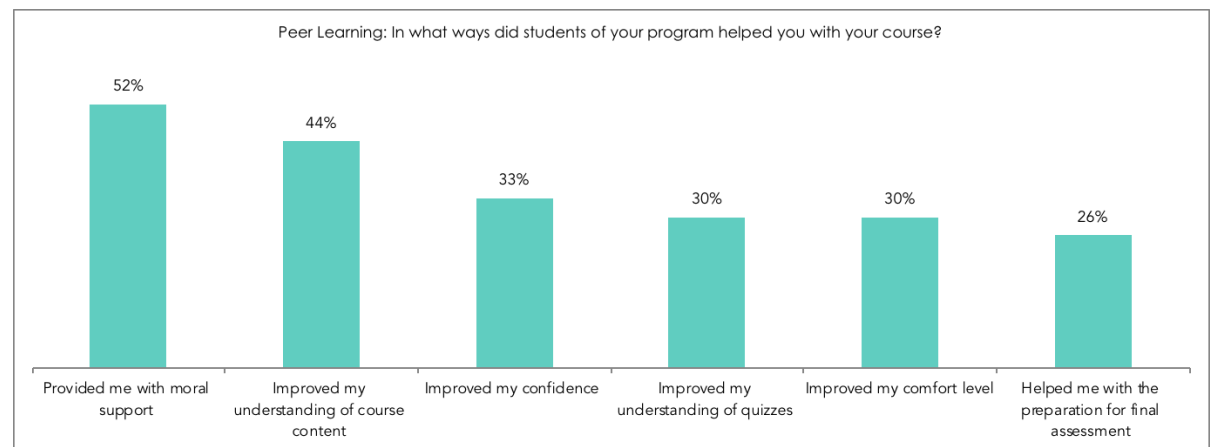
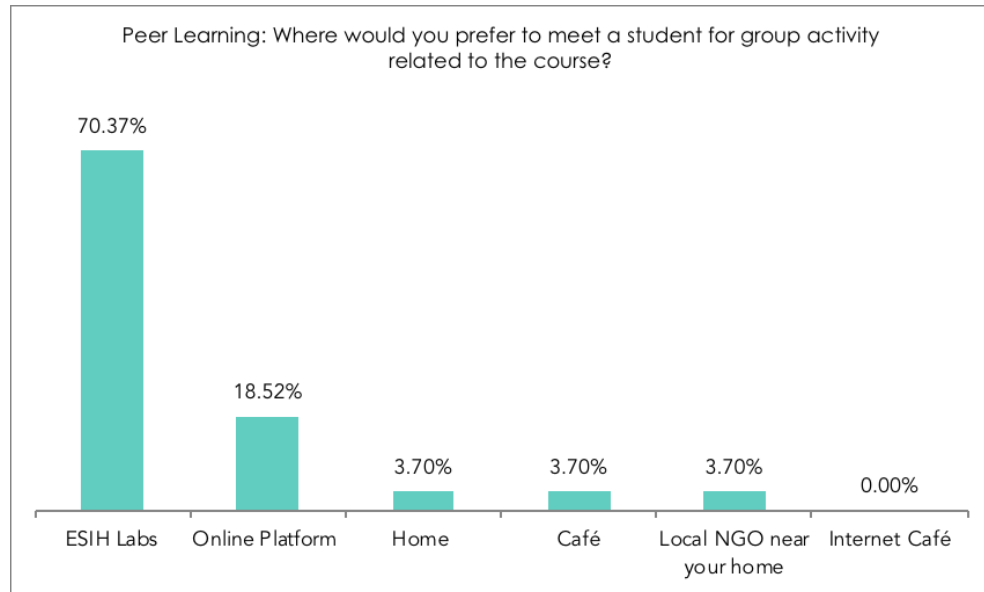


Figure - Influence of peer learning on ICT Professionals (Source: End Term Evaluation Survey)



- Communication Channels: Students preferred and used WhatsApp the most to communicate with peers. While Slack Channel was reported to be used most for peer interaction, Girls also often communicated in small groups through WhatsApp. The students saw the WhatsApp group as a community that supported learning facilitation in the form of support and encouragement.
- Group Interactions: There was a unanimous desire among both Girls and ICT professionals for an increase in opportunities to interact with their peers. when asked if they wanted more opportunities to connect with their peers through group activities. All of the students responded with a resounding 'yes'. Most students preferred to meet at ESIH.

Figure - Location preference of ICT Professionals for group activities (Source: End Term Evaluation Survey)



- Group Practice Sessions, Girls: There was a consensus among all the Girls on the need for more practice sessions to better ground themselves in the coursework. Most Girls desired for an in-person projector session for students and facilitators to discuss the module exercises together. The desire for an in-person practice session was particularly noted for the last module on data which was considered most difficult.
- Scenario Based Practice Sessions, ICT Professionals: The ICT Professionals unanimously expressed disappointment at the lack of simulations and scenarios-based exercises. They felt they were not able to apply the theory they learned through practice sessions leading to low level of confidence in the potential to apply the skills learned.
- Evaluation of the course content
 - Course Effectiveness: The perceived effectiveness of the module decreased with increased difficulty.
 - Girls found the more difficult modules – data fundamentals and capstone projects – useful and desired more practice sessions and time to better ground themselves in the two modules.
 - With ICT professionals, a stark contrast as in the case of Girls was not indicated by the data. Instead, small differences were seen –
 - Network Management: Seminar 4 was considered most difficult overall, and seminar 4-6 and 10-12 were reported to have less clarity in learning goals and objectives. Students spent most hours in seminars 4, 8, 9, 11 and 12.
 - Security Course: Students spent most hours in Seminar 6, 10, and 12 which were also considered more difficult. Seminar 6 and 10 were also reported to have less clarity of learning goals and objectives.
- Course Language and Technology: All the Girls used tablets to access the course material and used French as the language of instruction. Besides the initial technical problems encountered with downloading apps on the tablet, the students found course navigation and use of platform easy. ICT professionals navigated the course only in French, with no option to use any other language. The technical challenges were mostly owed to the functionality of the quizzes. A lot of students had to restart the quizzes multiple times due to a

bug in the program. Some students also expressed frustration at not being able to refer course materials while completing the quizzes.

- Self-regulation and self-directed learning: Girls were encouraged by the goal-oriented and autonomous character of the curriculum design. The access to course schedule in advance, ability to track grades, multiple attempts at quiz, and links to outside materials played an important role in instilling a culture of self-regulation and planning in Girls. The lack of ability to regularly track performance negatively affected the self-regulating capability of the ICT professionals. Multiple attempts were appreciated but a more challenging set-up was desired by the students.

Employability Factors

- Market Immersion: Majority of the Girls agreed to the intent of seeking a job after the completion of the course. A preference was seen towards freelance or part-time work: more than two thirds of the students selected part-time job (70.83 percent) over full-time-job (16.67 percent) and 12.50 percent were seeking both part-time or full-time opportunities. Girls preferred freelance and part-time work because of the greater autonomy and flexibility it offered. A vast majority of the ICT professionals (59.26 percent) preferred full-time employment at an IT company over self-employment.
- Application of Skills: Both the groups were interested in advancing the skills that they learned through the course by seeking opportunities in the IT sector. While Girls recognized that the digital skills that they have learned open many avenues in the field of IT, most Girls wanted work in the field of data management. The ICT students wanted to be employed at the leading companies within telecommunication sector such as Digicel, NatCom, and Conatel.
- Skill and Infrastructure Barriers: The Girls identified multiple challenges that they faced in accessing work opportunities in the market. With Girls interested in the freelance work, the challenges were primarily infrastructural and related to lack of reliable internet bandwidth and high cost of electricity backup. Girls who were seeking full-time employment saw lack of experience (83.33 percent) and transportation (66.67 percent) as the biggest barriers.

Figure – Barriers to independent work as reported by the Girls (Source: End-Term Evaluation Survey)

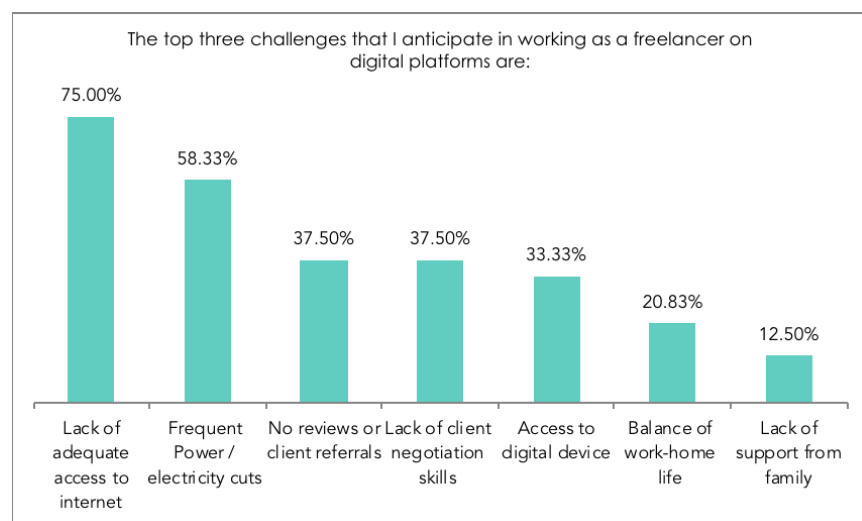
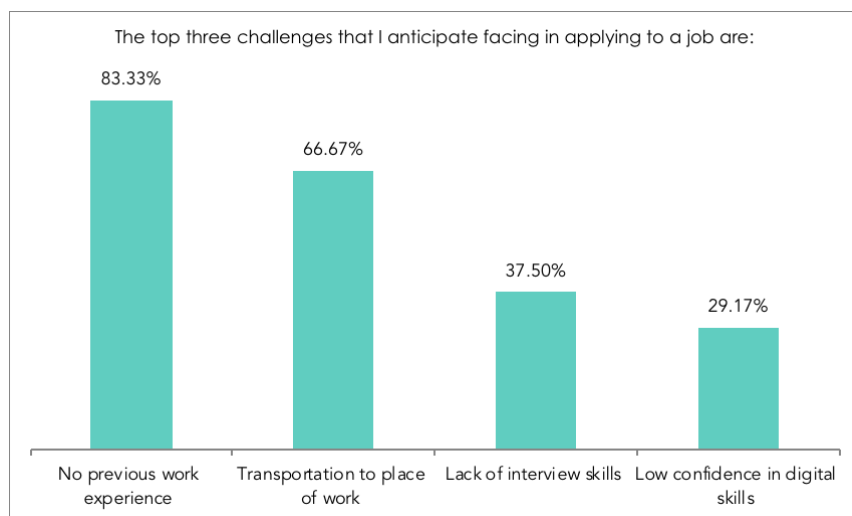


Figure – Barriers to full time employment as reported by the Girls (Source: End-Term Evaluation Survey)



Program Performance

- The program met its benchmark for engagement and had a low attrition rate and high graduation rate. Despite the limited window time, ESIH received an overwhelmingly high response. 178 applications were received for the Network Management and Security courses, of which 90 applicants were called for an in-person interview. Finally, 50 students were enrolled with 25 each in Security and Network Management courses. 200 applications were received for the Internet and Data Practitioner course. 85 students were called for an in-person interview and 50 students were enrolled in the program. All 100 students joined the program. Of the 100 students who joined the program, 46 ICT professionals and 49 Girls attended the orientation session. Only 2 Girls dropped out due to family problems and 86 percent of the Girls graduated with a score of 60 percent and above. The attrition rate was also low for ICT professionals, only 2 students dropped out and 56% of the students graduated the program.

Figure – Enrollment, attrition, and graduation related statistics [Source: Partner Reports]

200	80	50	2	86%
Girls applied to the program	Girls called for an interview	Girls enrolled in the program	Girls dropped out of the course	Girls graduated with a score of 60% and above
178	90	50	2	56%
ICT pros applied to the program	ICT pros called for an interview	ICT pros enrolled in the program	ICT Pros dropped out of the course	ICT Pros graduated from the program

- The program met its benchmark for engaging and training qualified facilitators at a ratio of 1:25 for the students of all three programs: Internet and Data Practitioner, Network Management, and Security.
 - Network Management and Security: Two applications were received for each of the ICT professional courses facilitator job post of which one facilitator was selected and trained, achieving the targeted student to facilitator ratio of 1:25.
 - Internet and Data Practitioner: Five applications were received for internet and data practitioner facilitator job post of which three facilitators was selected and trained, achieving a student to

facilitator ratio of 1:17, a better ratio than the targeted ratio of 1:25.

- The program delivered all courses on time but unexpected delay due to translation affected quality assurance of the courses. The course content was designed by two partners – LACNIC and COI. LACNIC developed and designed the course content for network management and security to be uploaded to Thess in pdf format. Besides the quiz feature and chat forum, no other feature of the Thess was used. COI designed and developed the course for internet and data practitioner. While the course was meant to be uploaded to Thess, to avoid technical problems and due to shortage of time, the course was delivered on ADAPT.
- The activities for IXP reinforcement and IPV6 support were on track with multiple trainings implemented. It is too soon to comprehend the impact of these activities.
- The partner outreach activity conducted by LACNIC revealed set-up of a new SME to be less impactful than increasing the Girls capacity to target talent platforms. The focus shifted to talent platforms. A new employment consultant was hired by IDC and LACNIC. The consultant will be responsible for securing work through brokers on talent platforms and in the local market while simultaneously building capacities of the women to avail these opportunities.
- While the program had an effective outreach and selection process in place, the process needs to be account for more time and the online application needs to be optimized. Greater coordination is desired between different partners.

IV. Lessons Learned

Detailed programmatic recommendations build upon the main findings to support and accentuate the successful elements of the program while making refinements and additions to the elements that desired improvement.

Recommendations include:

- Leveraging existing relations with community based organizations to better achieve the target profile set for the program, specifically more participation from Girls who only had tertiary education and increase female participation in ICT group;
- Relook at age as a criteria for ICT students as a significant negative relation was seen between the performance and increasing age of the students. Older students also tend to have more work and marital responsibilities that also show significant relation with low performance;
- During the orientation, students should be instructed on how to manage time and better handle time between household, work, and education;
- Apart from time management, instructions should also be provided on the management of online courses and resources, apps, and communication channels. A walk through should be provided through the digital platform.
- Attempt should be made during the orientation to bring students with extremely low digital literacy to a minimum digital literacy profile required for the course;
- A quality assurance must be conducted to get rid of technical difficulties and syntax errors;
- Students should be able to track grades, receive deadline and quiz notifications, and switch languages;

- A dedicated lab space with reliable power back up and internet access should be provided to overcome infrastructural barriers and encourage peer interactions;

The recommendations are outlined in detail within the report in the Recommendations and conclusion chapter.

V. Conclusion

Students took the online course for a number of reasons varying from the rise of digital economy and closing the digital gender divide in the labor participation to gaining employability skills and increased access to jobs and internship. Several factors influence their experience, some of which students control and some of which are systematic barriers that requires an enabling action.

Facilitators have already successfully managed to establish presence in the absence of physical copresence and worked to build relationships with students and create a sense of community. The courses less some difficulties have been engaging and effective in their course content. But the successful factors of the program need to be balanced with multiple other factors. Students have to balance work and family, to manage time, and to make a personal commitment. Creative and strategic solutions need to be created to mitigate the infrastructural barriers. More meaningful learning experiences need to be developed through scenario-based practice sessions. And the impact and reach of the program need to be broadened by leveraging relations with community-based programs.

Further for training round 2, a better understanding of the enabling factors that affect the cost benefit of the program and can impact scaling-up of the program need to be tested. While the study of training round 1 clearly established the importance of in-person component of learning facilitation, it also indicated contradictory evidence that showed barriers – access to transportation, employment, and household related responsibilities, that make it difficult for students to attend these sessions. Evidence should be gathered in training round 2 to understand which of the two barriers – (1) transportation and responsibilities or (2) internet access and lack of in-person group interaction – have more effect on the performance of the students.

2. Introduction

I. Program Overview

Ayiti Goes Global Program (AGG) is a pilot initiative of the Latin America and Caribbean Network Information Centre (LACNIC) and International Development Research Centre (IDRC) that seeks to enhance Haitian participation in the global economy through creating enabling conditions for Haitian female youth to find employment in the digital economy by addressing skills and infrastructure deficits in Haiti. 3x3 is supporting the LACNIC and IDRC in the monitoring and evaluation of the pilot initiative in coordination with a local M&E consultant. The pilot initiative is working on two fronts:

(a) Promoting the growth of a data-related job market in Haiti: Teaching digital skills to 300 female youth and facilitating remote jobs in overseas markets in digital and data-related services. Target beneficiaries include female youth aged 18-29 with basic technical knowledge who will be trained in digital skills and data-processing. This group will be offered basic to mid-level trainings and assisted in securing remote jobs in overseas markets.

(b) Boosting Internet Infrastructure and connectivity in Haiti: Building capacities among advanced ICT professionals to encourage the growth and improvement of Internet services in Haiti. Target beneficiaries will include ICT professionals involved in developing and operating telecommunication networks across the country and professionals from technical colleges and universities. This group will be offered advanced-level trainings on a range of ICT subjects such as Network Management, Wireless Data Networks, Computer Security and IPv6 Deployment. Capacity-building actions will be accompanied by the creation of a local ICT cluster to promote entrepreneurship and encourage synergies and the growth of new initiatives among local professionals.

In the mid-term, the project will deliver a cohort of young female professionals with digital skills that allow them to secure remote jobs in overseas markets. In the long run, and through advanced-level trainings, the project will contribute to strengthening the local human resources needed and encourage local initiatives to further Internet Development in Haiti, with the understanding that a more developed digital services market will demand greater maturity of Internet networks. Additionally, the project will contribute overall to a greater female presence in the field of ICTs, which today is widely dominated by male professionals, and begin encouraging a data-culture within Haiti.

II. Background

Multiple studies were carried out in 2017 to develop the programing for the pilot initiative. 3x3 supported the creation of digital and data skills course and curriculum through the study of demand opportunities in overseas market. The demand study sought to identify opportunities for greater fluidity in digital data markets between Haiti and abroad. Specifically, it focused on remote work offering an opportunity to enable greater participation in the global digital economy and fostering an inclusive growth in Haiti. Complementing the demand study, Supply research was conducted by ESIH to understand the baseline profile of the two target beneficiary groups i.e. young women aged between 18-35 and ICT professionals. Pedagogical Strategy research conducted by Slash Roots to

understand effective approaches that could help enhance the performance of the students and prevent attrition. Caribbean Open Institute designed the curriculum for the young Girls and LACNIC designed the curriculum for ICT Professionals. A public consultation was held in November following which the program design was developed by LACNIC with the support of all the research partners involved in the study. The program design was confirmed by all the partners and evaluation plan was set in early 2018.

III. Scope of Evaluation Study

The evaluation focused on the three-month long implementation period of the training round 1 of the AGG program. Learnings from the study were applied at intervals throughout the training round 1 implementation to inform incremental adjustments and inform program design and curriculum adjustments for training round 2. The overall analysis at the conclusion of the program will be used scalability and replicability.

The specific objectives of the monitoring and evaluation study were to:

- Assess the change or impact attributable to programmatic activities
- Isolate key factors to test within the overall program design that affect impact
- Identify environmental conditions or factors that affect the successful implementation of programmatic activities.

IV. Evaluation Design and Methods

The evaluation included data collection activities at the start of the training, mid-point of the training, and end of the training to garner feedback and information from the trainees, trainers, and program partners. A mixed-method approach was employed using multiple data sources, including data from document review, selection and exit interviews with participants, focus group discussions, and surveys. Detailed information on the evaluation design methodology is provided in the Appendix.

The timeline of data collection activities and description of the data collection methods used in this evaluation follow:

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Selection application, screening interviews, and baseline reports

An online form and screening interviews were conducted to determine the eligibility of the applicants for the program and select the final trainees for the training round 1. Both the application and the screening interviews were also used to gather key baseline indicators on the trainees including socio-economic, infrastructural factors, and baseline skills to analyze for relation with student performance. This information is available for 100% of the participants of the program. (Appendix)

Course Assessment Survey Analysis

Two rounds of course assessment surveys were distributed and conducted at mid- and end-term with both the Girls and ICT Professional trainees to provide key quantitative information on different aspect of the program and capture

trainees' experience of different pedagogical factors such as platform access and course content, facilitation support and peer learning, self-paced learning and self-rating, and challenges experiences and feedback for course improvement. (Appendix)

Program Assessment Focus Groups and End Term Interviews

Two focus groups were held with both Girls (a total of 25 participants) and ICT professionals (a total of 13 participants) to provide qualitative information on the performance of the program and assess participant's experience of the program and course curriculum. Information and observations were captured on the motivation and barriers to meaningful participation in the program, expectations from the program, what went well, what did not go well, what can be improved, definition of success and expectations around employment. (Appendix)

End Term Interviews

End Term Interviews were conducted with four trainees and two trainers to provide qualitative information on the success of the initiative and gather feedback on the performance of the program. The aim was to get a deeper insight into the findings of the focus groups and surveys including motivations, challenges, behaviors, and aspirations. (Appendix)

Document and Reporting

Baseline, mid-term, and end-term pilot reflection reports gathered information and feedback from the partners to document the planning process for the recruitment and selection of the trainees, orientation session, and the course delivery.

V. Data Analysis

A number of methods were used to synthesize data from different sources and formulate findings:

Statistical Analysis: The online form and survey questionnaire was structured to provide numerical data such as baseline information and the experience of the participation trainees with different program activities. The numerical data was explored statistically using percentage score and weighted average to reinforce and generalize the insights gathered from the qualitative methods. Further, correlation analysis was used to study if any of the data gathered on the M&E factors showed a statistically significant effect on the completion of the course.

Triangulation: The data from all the sources was triangulated to validate findings, conclusions, and recommendations regarding the AGG training round 1. Preliminary findings were validated and confirmed with the program partners and operators through an online presentation and discussion at the end of the training round 1 to synthesize and determine M&E adjustments for training round 2.

Tagging: The key phrases from qualitative research were tagged to identify overall themes and patterns across the different modes and audiences. Attention was paid to context, consistency, and contradiction of views, frequency, and intensity of comments, their specificity as well as emerging themes and trends to remove researcher biases.

Methodological Limitations

The evaluation methodology utilized, while comprehensive, did encounter limitations. These limitations along with the actions taken to mitigate them are briefly described below.

Survey Engagement: There was a moderate rate of response and engagement from trainees for the course assessment survey. We received 48% and 56% response rate from Girls and 86% and 56% response rate from the ICT Pros for the mid-term and end-term survey. In training round 2, the survey links will be provided with the online course materials to increase the response rate.

Unreported data: The recruitment of local M&E consultant was challenging because of which the reporting templates and mid-term M&E activities were delayed. The delay in sending templates resulted in occasions when the data was simply not reported, such as tracking the attendance of the trainees during the in-person session or metrics around messages shared on the ESIH platform. This will be avoided in the training round 2 because the templates have already been shared and partners have adequate time to respond back.

Riots: The mid-term M&E activities including interviews and focus groups could not be conducted during the riots that happened in Haiti midsummer.

3. Impact of the Ayiti Goes Global Program

This section describes in detail the findings that emerged from the M&E study of the AGG training round 1. The following impact analysis is broken up into four sections of findings: 1) Socio-Cultural, Infrastructural, and Pedagogical Issues, which are findings related to the factors that influenced and affected the performance of the students, 2) Job Access Issues, which are findings related to the factors that affect the participation of the students in the digital economy of Haiti, and 3) Performance Issues, which correlate to the program delivery and activities.

3.1 Socio-Cultural and Economic Factors

Both in developing and developed countries, students from families with more socio-economic resources, support, and enabling culture are more likely to stay in a program and successfully complete it. This section discusses the effect of various socio-economic and cultural factors that have the potential to influence the successful completion of the program.

3.1a Socio-Cultural Issue: Time spent on work, education and household responsibilities

Most students, both Girls and ICT professionals, received support from their families but life issues such as a sick elderly at home or care of child often affected the performance of the students negatively.

Most of the Girls mentioned that their families, specifically their mothers, served as support for their online studies. The support was mostly passive, such as giving encouragement or helping the students memorize materials. For example, some Girls mentioned:

My mother was my biggest source of encouragement. I had a little sister that died, and sometimes we would cry and be depressed. But even while we cried, she would push me to continue/progress and focus on the program.

I would say my mom encouraged me a lot. I kept her informed about the program and she would always ask about my progress in the courses.

On the other hand, life issues often interfered with educational access and opportunity and vice versa, thus affecting student experiences. Some Girls found it challenging to successfully complete the program because they had to take care of a sick elderly or child at home and hence needed more support from the facilitators. Motivation and more one-to-one support played a huge role as indicated by one of the facilitators of the program:

There are students that will require intense one-on-one help. For example, there was a student (during the midterm focus group) that almost dropped out during the program because her child was very sick and was hospitalized. The other facilitator called me for assistance in convincing the student not to drop out. I had to really focus on her because she required more attention/assistance than Michelle [the other facilitator] was able to give her. It is necessary to have a lot of patience in order to keep the students motivated in order to prevent them from dropping out. Interactions are very important.

Time management also played a large role in dealing with coursework and family-related work. A moderate negative correlation was found between time spent on household activities (caring for household elderly, cooking,

religious and spiritual activities), and responsibilities related to marital life and parenting duties with the performance of the students.

Figure - Correlation with time spent on different activities and marital and work status for Girls

	In Course quiz score	In Class quiz score	Cumulative Score
InCourse quiz score	1.00		
InClass quiz score	0.46	1.00	
Cumulative Score	0.71	0.94	1.00
Caring for and helping household children	-0.08	-0.06	-0.07
Caring for and helping household elderly	-0.29	-0.12	-0.18
Cooking	-0.06	-0.26	-0.21
Getting water	-0.06	-0.10	-0.09
Other Household Activities	-0.09	-0.05	-0.07
All Household Activities	-0.18	-0.17	-0.19
Religious and spiritual activities	-0.12	-0.10	-0.12
Socializing, relaxing, and leisure	0.24	0.20	0.24
Marital Status Single = 1, Married = 2, Divorced = 3	-0.03	-0.18	-0.14
Do you have any children? Yes = 2, No = 1	-0.24	-0.18	-0.22
Do you work? Yes =2, No = 1	0.07	0.27	0.24

But while data shows a larger effect of household duties on the performance of Girls, survey responses indicated otherwise. Most Girls felt that the combined tasks of family and student life were feasible. Only a few students mentioned work and family as a factor that affected their experience; majority of the Girls said they could easily balance home life and course work (83.33 percent agreed, 12.50 percent neutral, 4.17 percent disagreed) and found course workload manageable (70.83 percent agreed, 25 percent neutral, 4.17 percent disagreed). This indicates that Girls' sense of their own ability to manage time was perhaps overly optimistic. They had low acceptance of the fact that the household's tasks are disrupting or competing with course work. Positive correlation with socializing, relaxing and leisure could indicate a need for Girls to spend more time on self-care to enhance their educational performance, and with work could indicate a better sense of time management on base digital skills.

A similar trend was also seen with the ICT professionals. The majority of the students said they could easily balance home life and course work (74.42 percent agreed, 23.26 percent neutral, 2.33 percent disagreed) and found course workload manageable (81.40 percent agreed, 16.28 percent neutral, 2.33 percent disagreed) but data analysis indicated otherwise. When the performance and baseline data was disaggregated by gender, a moderate negative correlation was found between time spent on household activities (caring for children, cooking, getting water, religious and spiritual activities), and responsibilities related to marital life and parenting duties with the performance of the students.

My mother was ill, and I had to take care of her.

A personal problem that I had was that I was sick at one point and was in the hospital, so I was late with a quiz.

My grandmother died during the learning.

Figure - Correlation with time spent on different activities and marital and work status for ICT Professionals

	All			Female			Male		
	Quiz Grade	Final Exam	Score	Quiz Grade	Final Exam	Score	Quiz Grade	Final Exam	Score
Quiz Grade	1.00			1.00			1.00		
Final Exam	0.31	1.00		-0.25	1.00		0.44	1.00	
Score	0.20	0.97	1.00	-0.39	0.97	1.00	0.32	0.97	1.00
Caring for and helping household children	-0.22	-0.11	-0.14	-0.44	-0.13	-0.18	-0.18	-0.10	-0.14
Caring for and helping household elderly	0.00	0.19	0.22	NA	NA	NA	0.04	0.21	0.24
Cooking	0.13	0.03	0.08	0.08	-0.72	-0.66	0.06	0.23	0.26
Getting water	0.11	0.02	0.02	0.13	-0.16	-0.26	0.05	0.07	0.11
Other Household Activities	0.04	0.05	0.10	-0.44	0.02	0.17	0.04	0.06	0.10
All household activities	-0.09	0.04	0.06	-0.40	-0.42	-0.38	-0.08	0.12	0.13
Sports, exercise, and recreation	0.13	0.03	-0.02	0.49	0.30	0.22	-0.05	-0.10	-0.12
Religious and spiritual activities	-0.22	-0.08	-0.01	-0.28	-0.59	-0.44	-0.22	-0.02	0.04
Socializing, relaxing, and leisure	-0.25	0.09	0.17	-0.70	-0.12	0.09	-0.16	0.13	0.19
Internet Browsing	-0.10	-0.48	-0.45	0.49	-0.18	-0.17	-0.20	-0.58	-0.54
Marital Status	-0.21	-0.23	-0.27	-0.48	-0.32	-0.29	-0.13	-0.22	-0.28
Do you have any children?	-0.21	-0.19	-0.24	-0.48	-0.32	-0.29	-0.14	-0.17	-0.24
Do you work?	-0.06	0.15	0.14	-0.18	0.02	-0.02	-0.09	0.18	0.17

The female ICT professionals bore greater burden of domestic responsibility (at least an average of 1 hour greater than male ICT professionals everyday as reported in the baseline data) and had a significant implication for women's ability to take actively take part in online courses. As female ICT professionals noted:

Generally, you know women (who we have to encourage/congratulate) are very capable. I am the woman who does all the cleaning, laundry, and tasks in my household. I live with my two nephews and I also take care of them. In the beginning I planned/scheduled my time in a way that I would be able to balance all these tasks. This is the strength of a woman and I applaud myself.

I define success as being able to pass all quizzes on time in spite of my household duties and the stressors of work.

In contrast, male students' performance had a positive correlation with time spent on taking care of elderly and cooking which could indicate a greater sense of autonomy and responsibility. But marital life, parenting duties, and religious and spiritual activities had a negative correlation with both male and female students' performance. The negative correlation with religious activities could be due to the fact that majority Haitians are Christians and most of the hours on Sunday go into the mass and activities related to the Church. This in addition to the fact that most ICT professionals were either working during their weekdays or studying at a university degree, as indicated in the comments below, could make it difficult for students to find time to study.

I had to devote time at the end of my university studies to obtain my diploma.

I had to travel locally because of my work which explains my delay in the submission of quizzes.

No because many of the students have jobs and obligations during the day. Even for the exam there were students who were unable to attend the session.

I thought that the program would have been easy to follow since I am on vacation (from school). But after I found an internship thing were a bit difficult since I now had less time than I anticipated. I found that I would have to wait until the Sunday night deadline to finish the module/exam.

For me the when I applied/signed up I thought I would be able to follow the program good enough (as in self-directed). But as the course progressed, I found that I would not have enough time to follow and the course material would accumulate. There were evenings where I would be trapped at work, which left me with little time for me to get the course readings completed.

We had deadlines for quiz. Because of work and university and their related tasks/obligations I knew that I had to organize my time accordingly. I set up a schedule, so I would know when to do what and keep myself organized. I was only late with one quiz I believe, I can't recall why.

Overall, it was evident that while with female students the time management was related to the need to offload some of the household responsibilities, with male students it was the triple role of family man, working man, and a student that was difficult. The ICT professionals sought support from different sources. Some found passive support from their work managers who encourages them to participate in the program and allow them off during work hours to study. Others found strength in family or peers, either monetarily or in the form of encouragement.

I found support from my manager. He was the one who encouraged me to participate. If it were not for his encouragement, I would not have been able to do it because there were times where I had to leave work a bit early in order to meet the program obligations. For example, today was one of those days since the exam started at 4 PM. There were also times that I had to complete quizzes during our business hours.

I am in charge of my family of nephews I was not expecting support from home. But in terms of my colleagues I found not only encouragement but many of them were also interested in participating in the program. I am constantly asked for updates regarding the next application process.

My family really encouraged me. This was especially the case with one of my uncles who paid for two months internet access for me in order to participate.

3.1b Socio-Cultural Issue: Financial Constraints

Financial background was seen most linked with access to transportation. There was also an indication that higher the income, lower the performance, because of more time spent on work than on the course.

As discussed under infrastructural factors, access to digital device and affordable transportation were big barriers. These factors are also intrinsically linked to the financial background. Many Girls expressed that the provision of free tablets and the lack of requirement to travel to ESIH made it possible for them to meaningfully participate in the program.

I would say in my family we are good at budgeting. But if things were not provided for us in this program, it would have been very difficult for us to take the program into account.

I had to alter my spending habits. The money that was set aside for other things was utilized to pay for moto-taxi transportation to ESIH.

A good thing with the program is that we are obliged to come to ESIH every day. All the work can be done from the tablet, so we are not spending that much money on transportation.

I was fortunate that the tablet was provided for in the course.

Similar pattern can be observed from the correlation table. In order to get a more holistic view on the financial capacity of the students households, they were asked not just for the monthly household income but also about other economic factors such as household assets and rent.

Figure - Correlation of income and household assets with performance of Girls

	Incourse quiz score	Inclass quiz score	Cumulative Score
Incourse quiz score	1.00		
Inclass quiz score	0.46	1.00	
Cumulative Score	0.71	0.94	1.00
Who is the head of household?	0.06	0.03	0.07
Who in your household has the final say on the household purchases?	-0.26	0.15	0.01
What is your average monthly household income?	-0.04	-0.03	-0.03
What is your household's average monthly expenditure?	-0.05	0.05	0.04
What is your average monthly household savings?	-0.08	-0.06	-0.06
What is your average monthly rent?	0.10	-0.04	0.03
Radio	0.08	0.03	0.05
TV	-0.01	-0.08	-0.07
Bicycle	0.03	-0.15	-0.09
Motorcycle	0.14	0.01	0.07
Car	0.13	0.32	0.30
Refrigerator	-0.30	0.02	-0.09
Bank Account	-0.14	-0.25	-0.25

The average monthly income, expenditure, or savings had no effect on the performance of the Girls. As discussed before, this is probably due to the provision of the tablets. Interestingly, it was the presence of car that had a positive correlation with the performance of the students. This highlights the importance of transportation cost barrier further.

There was some negative correlation between performance of the students and ownership of refrigerator and bank account. The two assets could be indicative of better income and hence more work or busy schedule. A correlation analysis was conducted to see the relation between the two assets and monthly income. It was found to be 0.37 for refrigerator and 0.38 for bank account that confirms the negative effect of high household income on the performance of the students. Attempt would be made in the second training round to better understand if the higher income is directly related with more time spent on work and hence less time for education or if it has more to do with lack of motivation.

Similar to the Girls, ICT pro students' performance also had positive relation with the ownership of vehicle, in this case both motorcycle and car. Again, an indication of higher income showed a negative correlation with performance perhaps due to more time spent on source of income and work preventing better participation in the course.

Figure - Correlation of income and household assets with performance of ICT Professionals

	Quiz Grade	Final Exam	Score
Quiz Grade	1		
Final Exam	0.31	1.00	
Score	0.20	0.97	1.00
Who in your household has the final say on the household purchases?	0.07	0.03	0.03
What is your average monthly household income?	-0.03	-0.22	-0.22
What is your average monthly household savings?	-0.22	-0.29	-0.28
How much rent do you pay for your house?	0.01	0.12	0.12
Radio	0.00	0.03	0.05
TV	-0.16	-0.03	0.02
Bicycle	-0.01	0.08	0.10
Motorcycle	0.11	0.31	0.30
Car	0.23	0.24	0.26
Refrigerator	-0.02	-0.01	0.01
Bank Account	0.08	0.16	0.16

3.1c Socio-Cultural Issue: Baseline Capabilities

Grasp of French and English language and basic ability use smartphones and had more effect on the Girls' performance than the baseline knowledge of software. There was no discernible relation seen with the baseline skills of ICT professionals except prior knowledge of DNS.

A baseline digital capacity was measured through self-rating of students' proficiency in major software programs, operation of digital devices, familiarity with regular internet functions such as apps and cloud storage, language, and soft skills such as time management and social skills.

In general, students expressed frustration with the different in the skill level of students. Specifically, some Girls mentioned that couple of students had extremely low level of digital literacy struggling even at handling a mouse. They suggested additional sessions for these students, so they feel more comfortable.

There was an issue that is not directly related to the program. There were some students that had a very low level of basic technology skills. The facilitators need to have some additional sessions for them. For example, I know how to turn a computer on/off, but there were those that could not. There were some that did not know how to use a mouse. I think there should be some training for the students at those very low levels so that they can get more comfortable with the tools. If they are not properly assimilated, they will eventually come to hate it.

I know that this was the first iteration of the program. This is also a learning experience for the Administrators. Perhaps they didn't anticipate this problem in the beginning, but it is something that they have discovered. I am sure that they are also taking notes to see what needs to be changed. Moving forward they can have different levels and assign the

students accordingly. Some are extremely low, and some are advanced. During the application/selection process we were asked about our levels but there was no challenging/testing of our self-ratings. Also, this is an opportunity for the facilitators and me. If the facilitators are working with the very challenged students, this gives me a chance to work with a student who is more on my level. Since we need to practice, while I am helping a student learn a topic it is also reinforcing the topic for myself. I am now mastering the topic.

Correlation analysis showed that basic digital skills did have an effect on the performance of the Girls, specifically as it related to installation of application, operation of smart phone, use of cloud storage, and bookmarking webpages. Language, specifically French and English reading and writing proficiency also had a major influence on the performance of the students. Prior knowledge of software such as Microsoft office had less bearing on the performance and showed very weak to no correlation. Most students who self-rated themselves higher on decisiveness, self-motivation, openness to learning, integrity and reliability performed better.

Figure - Correlation of baseline skills with performance of Girls

	Incourse quiz score	Inclass quiz score	Cumulative Score
Incourse quiz score	1		
Inclass quiz score	0.46	1.00	
Cumulative Score	0.71	0.94	1.00
Microsoft Word	-0.09	0.08	0.07
Microsoft Excel	-0.17	0.13	0.06
Microsoft Powerpoint	-0.12	-0.08	-0.09
Microsoft Access	-0.07	0.13	0.09
Sequel	0.08	0.17	0.17
Bookmark webpages	0.24	0.22	0.25
Use remote / virtual communication systems (VoIP, videoconferencing, audio conferencing, telemeetings)	0.16	-0.01	0.06
Use cloud storage and download services to share files (Google Drive, Dropbox, etc.)	0.23	0.10	0.16
Work in a collaborative manner on the Internet with friends and acquaintances using the appropriate tools (Google Drive, Sites, Scoop it)	0.15	0.10	0.12
Send and receive money online using appropriate tools (Mon Cash, Xoom, Uniteller, Western Union, MoneyGram etc.)	0.08	0.20	0.18
English / Anglais Reading	-0.07	0.25	0.19
English / Anglais Writing	-0.12	0.21	0.14
English / Anglais Speaking	-0.19	0.09	0.02
Spanish / Espanol Reading	-0.07	-0.11	-0.09
Spanish / Espanol Writing	0.03	0.12	0.12
Spanish / Espanol Speaking	-0.05	0.04	0.02
French / Français Reading	-0.01	0.23	0.19
French / Français Writing	0.01	0.25	0.22
French / Français Speaking	-0.03	0.16	0.13
Configured an application	0.02	0.13	0.12
Solved a problem	-0.33	0.00	-0.09
Sought help online	-0.22	0.06	-0.01
Helped to install an application?	0.24	0.35	0.39
Have you ever used a computer?	-0.09	0.09	0.02
Have you ever used a tablet?	-0.08	0.17	0.11
Have you ever used a smartphone?	-0.10	0.21	0.09

Communication	0.02	0.15	0.16
Decisive	0.38	0.08	0.22
Self-Motivation	0.41	0.16	0.28
Capacity	-0.02	0.11	0.09
Collaborative	0.31	0.06	0.15
Willingness to work	0.16	0.00	0.08
Social Skills	0.17	0.18	0.20
Openness to learning	0.14	0.28	0.29
Positive Attitude	0.18	0.18	0.19
Integrity	0.23	0.17	0.22
Leadership	0.02	0.02	0.04
Confidence	-0.05	0.18	0.18
Professionalism	0.15	0.13	0.16
Responsibility	0.15	0.14	0.17
Punctuality	0.06	0.11	0.11
Reliability	0.20	0.21	0.23
Time Management	-0.10	-0.11	-0.12

Correlation analysis for ICT professionals showed a positive correlation with the prior knowledge of DNS. Other than that, there was an indication of negative effect of knowledge of Firewall and IOS. The qualitative evidence did not reveal any reason for the same, and if a pattern is seen in Training Round 2 as well, Training Round 3 will seek to see the reason behind it. Language proficiency did not show any set pattern. There was some positive relation seen quiz results and English and Spanish language, while French seemed to have a negative relation. A negative correlation was seen with the self-reported rated scores on soft skills. This could be due to an overestimation of the self-ability in the case of ICT students or false reporting. More qualitative questions on baseline skills will need to be asked in Training Round 2 to understand the analysis above that is not comprehensible through data alone.

Figure - Correlation of baseline skills with performance of ICT Professionals

	Quiz Grade	Final Exam	Score
Quiz Grade	1		
Final Exam	0.31	1.00	
Score	0.20	0.97	1.00
TCP / IP	-0.05	0.06	0.12
Ipv6	0.16	0.13	0.18
Network Troubleshooting	-0.08	-0.02	0.00
IP subnetting	0.09	0.12	0.18
Network Security	0.05	0.05	0.08
DNS	0.04	0.16	0.21
FTP	-0.11	-0.02	0.07
LInux	0.02	0.16	0.21
PING	-0.05	0.02	0.11
Firewall	-0.15	-0.32	-0.24
NAT/PAT	0.08	-0.20	-0.18

Traceroute	-0.06	-0.08	-0.01
dig	-0.17	-0.13	-0.05
bash	-0.04	-0.07	-0.04
cloud computing	-0.13	-0.04	0.00
Linux	0.03	0.03	0.06
Unix	-0.15	-0.06	-0.02
Windows 7/8/10	-0.16	-0.06	-0.05
Windows Server 2008/ 2012/ 2016	-0.17	-0.16	-0.14
RouterOS	-0.13	-0.14	-0.09
IOS	-0.22	-0.27	-0.24
BASH	-0.04	-0.08	-0.08
Python	0.14	-0.09	-0.13
Perl	-0.18	-0.06	-0.04
C/C++	0.14	0.01	0.00
Java	0.13	-0.12	-0.15
Javascript	0.00	-0.12	-0.15
HTML	0.06	-0.11	-0.09
Static Routing	-0.03	0.05	0.10
OSPF	-0.14	-0.18	-0.11
BGP	-0.18	-0.13	-0.04
RIP	-0.19	-0.15	-0.07
English / Anglais Reading	0.05	-0.04	-0.04
English / Anglais Writing	0.04	0.06	0.07
English / Anglais Speaking	0.27	0.12	0.13
Spanish / Espanol Reading	0.34	-0.14	-0.15
Spanish / Espanol Writing	0.35	-0.09	-0.11
Spanish / Espanol Speaking	0.33	-0.08	-0.10
French / Français Reading	0.11	-0.07	-0.11
French / Français Writing	-0.22	-0.10	-0.13
French / Français Speaking	-0.20	-0.23	-0.23
Communication	-0.18	-0.05	-0.03
Decisive	0.02	-0.01	-0.02
Self-Motivation	-0.22	0.10	0.15
Adaptability	-0.28	0.06	0.09
Collaborative	-0.40	-0.18	-0.15
Willingness to work	-0.26	0.00	0.00
Social Skills	-0.45	-0.23	-0.19
Openness to learning	-0.05	-0.10	-0.08
Positive Attitude	-0.11	-0.03	0.00
Integrity	-0.04	-0.17	-0.13
Leadership	-0.15	-0.21	-0.18
Confidence	-0.12	0.02	0.05
Professionalism	-0.17	-0.04	-0.02
Responsibility	-0.28	-0.04	-0.03
Punctuality	-0.35	-0.03	0.02
Reliability	-0.09	-0.09	-0.08

3.2 Infrastructure Deficit

It was evident from the evaluation study that there are huge infrastructural deficit problems that need to be addressed if the students are to achieve a meaningful participation in the online courses. Analysis of responses revealed problems related with infrastructure including inconsistent electrical power supply, insufficient internet connectivity (bandwidth capacity), lack of affordable transportation alternatives, and inadequate access to computers and computer laboratories. The obstacles related to these infrastructural deficits varied between the Girls and ICT professionals.

3.2a Infrastructure Issue 1: Limited Internet Connectivity

Limited Bandwidth was amongst the biggest barrier that dissuaded, constrained or obstructed the student's meaningful participation in the online course.

There are three major service providers of the high-speed internet: Hainet (43 percent market share), Multi-Link (20 percent market share), and Access Haiti (32 percent market share). All the internet service providers provide different options for purchasing data in order to make internet accessible and affordable to all. But Haiti's internet bandwidth is much lower than in other Caribbean countries. Jamaica has 30x, Dominican Republic 35x, and Puerto Rico 73x times the bandwidth of Haiti.¹ This shows that internet access is not as much a problem in Haiti as internet speed or bandwidth capacity. Evidence gathered through the evaluation study confirmed this fact.

Majority of the students reported lack of access to the reliable internet as their top barrier to meaningful participation in the online course. The issue of limited bandwidth capacity had more impact than internet access on the experience of Girls (45.83 percent) than the ICT professionals (19 percent). The Girls had challenges with downloading course content and engaging in quizzes and educational materials available in a video format. They also spent more hours than anticipated because of low internet speed often causing frustration and fatigue. For example, some students from data and practitioner course expressed:

Let's say you are fortunate to have electricity, a router, and a data plan. Oftentimes the signal strength is so poor that it leaves you discouraged. You have to stay up until 11 PM or midnight in order to do the work but by then you are too tired and sleepy...

I cannot say that I succeeded at 100percent. We were assigned a project and I did not finish it. I only did a portion. I did not do well with the quizzes. I had great problems with internet...

Access to internet in Haiti is a problem. If you don't have access it's too difficult to participate. In my case, it was very difficult because I didn't always have access and had a hard time completing the exercises.

The lack of internet access makes it difficult to complete the quizzes. Sometimes you have to start over.

The internet was a problem. If I were lucky, I would be able to go to ESIH to access the materials and do the work. If I had money, I would buy data credits, but it doesn't last long. By the time you download some materials the service is over. Sometimes I would ask my father for money to buy credits as well.

¹ Google. October 2010. Idea's for Haiti Internet Reconstruction. Google.org. Accesseed at <https://www.google.org/docs/Haiti.pdf>

With ICT professionals, the challenge of internet access was related less with the bandwidth capacity and more with the quality of the connection. Weak WIFI signals at certain geographical locations prevented the students from accessing course materials while at home or work. Some students from the ICT Professional course indicated:

I also had internet access problems. Sometimes it was the fact that there was no WIFI and other times it was that the signal was too weak. At work we currently do not have WIFI... There were times where I would try to use my phone and the pages would not load...

My difficulties were limited to the internet. Even If I used my data plan the connection was not good. In fact, it was bad...

Sometimes the internet signal is too weak in my area. Because I live at the base of a hill I sometimes have to climb up in order to find a working reception...

I have an Internet access problem by my house, sometimes it can last 3 – 4 days

My family really encouraged me. This was especially the case with one of my uncles who paid for two months internet access for me in order to participate.

A study of the baseline data shows that all of the students had access to the internet on their phones but only 52 percent of the Girls and 88 percent of the ICT Professionals had access to the internet at home. Besides home, a majority of Girls also had access to the internet at University and about one fifth had access at work. Majority of the ICT professionals had access to the internet at various other locations besides home: cyber café, university or school, and work.

Figure - Internet access [Source: Online Application Form]

Location	Girls	ICT Professional
On Phone	100percent	100percent
At Home	52percent	88percent
At Cyber Café	7percent	50percent
At University / School	56percent	62percent
At Work	20percent	66percent

To understand if there is a significant relationship between the performance of the students and the internet access, a correlation was conducted.

Internet Access	Girls			ICT Professional		
	Correlation InCourse Quiz	Correlation InClass Quiz	Correlation Cumulative Score	Correlation InCourse Quiz	Correlation Final Exam	Correlation Cumulative Score
On Phone	NA	NA	NA	NA	NA	NA
At Home	0.024	-0.13	-0.12	0.20	0.17	0.15
At Cyber Café	0.094	0.04	0.03	-0.225	0.11	0.14
At University / School	0.098	-0.05	-0.001	-0.10	0.26	0.29
At Work	0.234	-0.16	-0.04	-0.184	0.25	0.18
Data Purchase Frequency	0.19	0.19	0.20	0.098	0.17	0.18

A moderate relationship was seen between the performance of the Girls in InCourse Quiz and internet access at work and the performance of the ICT professionals and internet access at University. With the ICT professionals, internet access at home had a moderate relation with the performance in course quiz while internet access at university or work had a relation with the final exam. The relationship could be due to better internet speed at work or university. A weak to moderate relation was also seen between the performance of the students across the assessment activities and data purchase frequency. The performance was lower for students who had prepaid data plans and paid daily to those who paid weekly, monthly, and annually.

3.2b Infrastructure Issue 2: Unreliable Electrical Power

Frequent power cuts were a significant barrier that constrained access to the course materials and practice.

The electric service is provided by the public utility Électricité d'Haïti (ED'H) in the Port-au-Prince (PAP) metropolitan area through a centralized grid, with about 200 MW of connected generating capability. The supply is much below the demand. Areas that are located outside of the PAP area, electricity service is scarcer, with roughly 10 regional grids each of 2-20 MW in size operated by ED'H. About 20-40 percent of all Haitians have some access to electricity through ED'H and no one received reliable electricity service from ED'H on a 24/7 basis.²

The evaluation study confirmed the issue of frequent power cuts that had almost an equal impact on program experience of the Girls (the top challenge for 25 percent) than the ICT professionals (the top challenge for 26 percent). The students need the power to run and charge technological devices and the lack of reliable electrical power supply presented an obstacle to access the course materials and quizzes. For example, some student of the internet and data practitioners course indicated:

The lack of electricity makes me inefficient in completing the homework and quizzes.

Sometimes I had difficulties because I have to set aside time due to the lack of electricity. When there is electricity, I have to make sure the tablet is charged while charging other things because you are not guaranteed service tomorrow. The modules require a lot of energy, so if the tablet is not fully charged it takes much longer to complete the modules.

I was fortunate that the tablet was provided for the course. It is only because of the electricity that I am sometimes late for the quizzes.

Sometimes there are some things that you would like to do on the tablet, but it is dead. Electricity is never provided so that you have the opportunity to charge it. In the course modules there are parts that require you to watch a video, but if we do not have the power we can't watch. If I try to watch on my phone, the quality is not the same as on the tablet.

Frequent power cuts and unreliable supply affected the use of technological devices even when the students ensured that the tablets were charged. The lack of 24x7 electricity supply also affected the experience of the ICT professionals. One of the students stated:

In terms of completing the coursework sometimes I do not have electricity access and all of my electronic tools are dead.

² Boston University Institute for Sustainable Energy. March 2018. Assessment of Haiti's Electricity Sector. Boston University. Accessed at <https://www.bu.edu/ise/files/2018/03/FINAL-Haiti-Electricity-Report-March-2018.pdf>

The poor availability and reliability of power supply from ED'H was also confirmed in the baseline study. While the majority of the Girls and ICT professional reported having access to electricity (96 percent and 98 percent), the supply varied between an average of 3 to 9 hours.

Figure - Hours of electrical supply [Source: Online Application Form]

Electricity Supply	Girls	ICT Professional
9+ Hours	20 percent	36 percent
6-9 Hours	40 percent	40 percent
3- 6 Hours	24 percent	22 percent
0-3 Hours	12 percent	0 percent
No Electricity	4 percent	2 percent

Only 34 percent of the Girls and 60 percent of the ICT professionals had access to power backup in the form of a generator or inverter. Also, power backups are considered a luxury because of the cost of operation and the presence does not guarantee that the household will run it for the whole duration of the power cut. Understanding that access to reliable electricity supply will be a barrier especially for Girls, the AGG program had provided tablets with the assumption that the students can charge the battery and use it during the power cuts.

It is apparent that the intermittent electrical supply affects the experience of the student and makes it less enjoyable. But the study is also focused on finding out whether it affects the completion of the course. To understand if there is a significant relationship between the performance of the students and the access to electricity, a correlation was conducted between the final scores of the students, hours of electrical supply, and electrical connections.

Figure - Correlation with the electrical connection, hours of electrical supply, and electrical backup [Source: Online Application Form and grades from reporting template]

Electricity Supply	Girls - Electrical Connection	Girls - Hours of Electrical Supply	Girls - Power Back up	ICT Professional - Electrical Connection	ICT Professional - Hours of Electrical Supply	ICT Power Backup
Incourse Quiz Score	-0.14	-0.27	0.13	0.16	0.12	0.08
InClass Quiz Score	0.32	0.01	0.03	NA	NA	-0.17
Cumulative Score	0.21	-0.07	0.05	-0.14	-0.02	-0.12
Gender M=1, F=2	NA	NA	NA	-0.07	-0.34	-0.31

The data analysis shows a moderate relation between the performance of In class Quiz and Cumulative Score with the presence of electrical connection for Girls. But because the number of Girls that did not have an electrical connection was very low, it is difficult to draw an inference. Further, the performance of Girls that have fewer hours of electrical supply seems to better indicate that there are other factors that play a larger role in the performance of the students. The data analysis also shows a moderate correlation that female households and fewer hours of electrical supply and fewer instances of no power back up.

3.2c Infrastructure Issue 3: Transportation Barriers

Traffic congestion and lack of efficient public transportation had more effect on the performance of the students with financial constraints

70 percent of all travel in Haiti is done on foot while 85 percent of vehicle traffic is congested in the Port au Prince metropolitan area.³ There is no public transport system except for the provision of Tap Taps, colorfully painted buses, pick-up trucks, and minivans that provide transport within cities as well as between cities.⁴ Other options include camionette (a small truck), taxi (usually an old Toyota Camry), and a motorcycle taxi (locally known as “motto”). Motorcycle taxi’s are the most expensive (of the options listed) as the motorcycle can hold up to 2 passengers and a driver. The motorcycle taxi rates are negotiated on a one-on-one and as needed basis, contrary to the bus and tap-tap rates.

Lack of access to affordable transportation alternatives and the time wasted in traveling through the congested streets of the PAP area was anticipated to be a challenge for the students especially for the in-person sessions and in-person exams. Given the AGG program was focused on a blended learning environment where maximum learning activities were planned online, it is not surprising that transportation was not reported to be amongst the top challenge. But the challenge of traveling from a distance to reach ESIH and using expensive transport to reach on time for the in-person facilitation sessions or exams was mentioned by many Girls during the focus group discussions. For example, some Girls indicated:

I had to alter my spending habits/budget. The money that was set aside for other things was utilized to pay for moto-taxi transportation to ESIH. Because I am coming from Carrefour there is often really bad traffic and I do not want to be late. So I have to sacrifice and take a moto-taxi.

It is a bit difficult because I come from Carrefour and sometimes, we have meetings/in person activities where I have to borrow money in order to make it here. But the problem is when I have to pay back, and I do not have the means to do so. For me, it is a personal problem.

A good thing with the program is that we are not obliged to come to ESIH every day. All the work can be done from the tablet so that we are not spending that much money on transportation. If it were everyday than that would be a different case.

I missed two sessions of practice due to the traffic jam. I could not arrive on time.

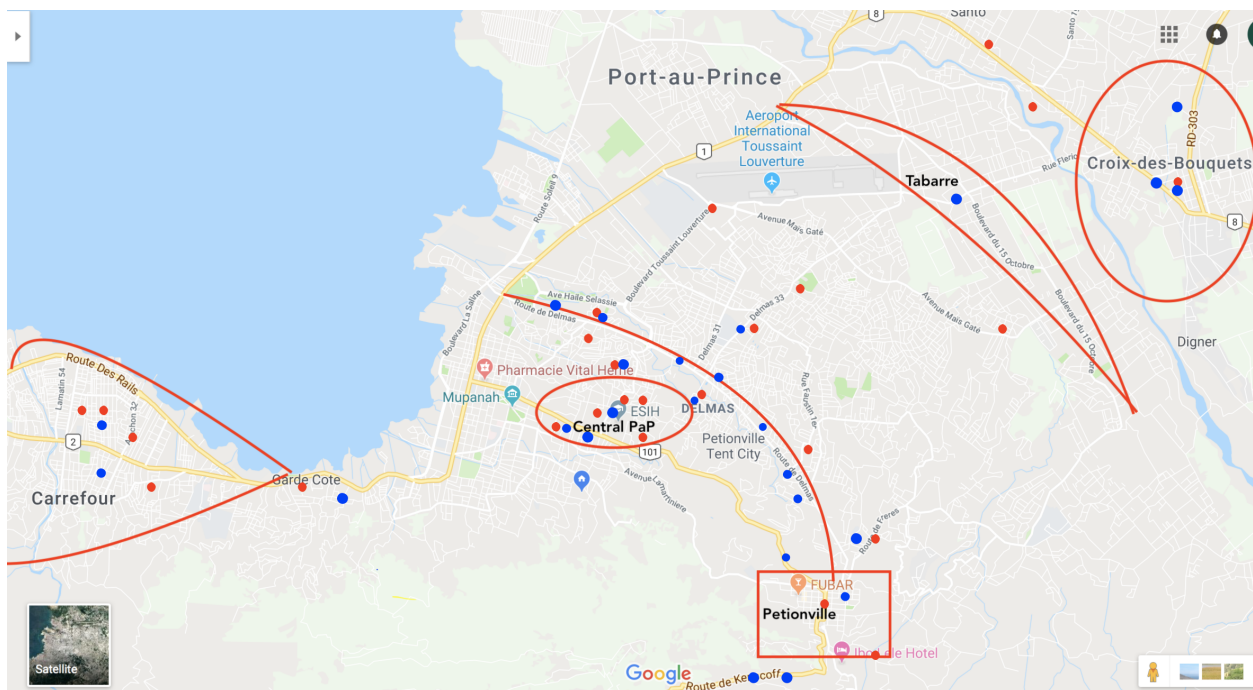
This shows that the challenge of transportation was closely tied to financial constraints for Girls. Each travel was an investment and required significant changes in their spending habits to meet the expense. This matter because while 47 percent of Girls lived within 1 km and 5percent within 1-2 from ESIH, about 15percent lived within 4-6 km and 31 percent of the Girls lived more than 6 km away from ESIH in the areas of Carrefour, Tabarre, and Croix-des-Bouqueta. It took 30 percent of Girls more than an hour and about 52 percent between half an hour to an hour to reach the ESIH labs. Further, only 6 percent of Girls reported that they walked to ESIH with the other 94 percent utilized private modes of transport: car/taxi (30 percent), bus (36 percent), or tap-tap (28 percent).

³ Coalition of Caribbean Urbanists. (2010). Report for Discussion : Workshop on the Reconstruction of Port au Prince, Haiti. p. 17. Retrieved January 9, 2011 from <http://haiti-patrimoine.org/?p=345>

⁴ PBS: Frontline. (2010). Solving the Tap Tap Puzzle (video). Retrieved Jan 20, 2011 from <http://www.pbs.org/wgbh/pages/frontline/haiti/view/tap-tap.html>

As ICT professionals only had to come to ESIH for one exam, the location of their residences was dispersed farther away from ESIH. Only 16 percent lived within 1 km, 22 percent within 1-2 km, and 26 percent within 2-4 km from ESIH. About 10 percent lived within 4-6 km and 26 percent lived more than 6 km away from ESIH in the areas of Carrefour, Tabarre, and Croix-des-Bouqueta. But despite living further away in comparison to Girls, the ICT professionals on an average took less time to travel to ESIH: 16 percent up to 15 mins, 34 percent between 16-30 mins, 30 percent between 31-45 mins, 10 percent between 46-60 mins, and 10 percent more than 60 mins. This could be attributed to the fact that the majority of the students had access to their own vehicles (38 percent car/taxi and 8percent motorcycle) while 16 percent could simply walk to ESIH. Only 16 percent used bus and 20 percent used tap-tap. The map below shows the location of Girls (red color) and ICT professionals (blue color).

Figure - Location of students (Girls – Red Color and ICT professionals – Blue color) in Port-au-Prince Area [Source: Online Application]



To understand if there is a significant relation between the performance of the students and transportation related factors, correlation was conducted.

Figure - Correlation with transportation related factors

	Girls			ICT Professional		
	Correlation InCourse Quiz	Correlation InClass Quiz	Correlation Cumulative Score	Correlation InCourse Quiz	Correlation Final Exam	Correlation Cumulative Score
Distance from ESIH	-0.19	-0.16	-0.19	-0.08	-0.23	-0.21
Time to reach ESIH	0.07	-0.06	-0.003	0.20	0.17	0.15
Mode of Transport	-0.24	-0.25	-0.28	-0.225	0.11	0.14

A moderate relation was seen between the cumulative performance of Girls and distance from ESIH as well as mode of transport used where tap-tap had the highest weight preceded by bus, car/taxi, motorcycle, and walking. A

moderate relation was also seen in case of the ICT professionals with the distance from ESIH, but the mode of transport only had significant relation with the in-course quiz.

3.2d Infrastructure Issue 4: Access to digital device

Despite the ability to work on the course on smart phones, access to other digital devices was determined to be an important factor. Provision of tablet to the Girls overcame the barrier of access to digital device for Girls. Ownership of digital device was much less amongst Female ICT professionals than male.

Supply side research conducted by ESIH in 2017 indicated that lack of access to digital device would be a top barrier preventing Girls from accessing online education. To overcome this barrier, all the Girls were provided a tablet by the AGG program at the start of the course. The evidence gathered during the evaluation confirmed the need to provide the tablets because of the financial constraints faced by some students as indicated in the comments below:

I was fortunate that the tablet was provided for the course. It is only because of the electricity that I am sometimes late for the modules/quizzes. I would not have been able to enroll in the course on my own. Not that I think this (the program) is charity but it is a good opportunity.

I would say in my family we are good at budgeting. But if things were not provided for us in this program it would have been very difficult for us to take this program into account.

Data analysis in the figure below shows that despite providing a tablet, a significant positive relation was seen between the performance of Girls and ownership of a laptop. The same did not hold true for the ICT professionals, no relation was seen between ownership of digital device and performance. This could be due to the fact that the majority had access to multiple devices as indicated by the comments below:

We had the tools. As for myself I have a laptop and a smart phone.

Not really, for example I have two laptops and the tablet. If the laptops are giving somehow problematic, I sometimes have the option of a work computer. When one is not working, I use an alternative option.

Send a survey for the participants to assess internet needs. Maybe provide a tool like tablet for those who have needs. While I do have other options there are times when the smart phone is too small, but the laptop is too big. A tablet would have been handy.

Most ICT professionals used their personal laptop (65 percent) to access the course materials. Some students also used their smart phones (16 percent), personal desktops (14 percent), and tablets (5 percent). The data analysis also shows a moderate negative correlation between gender and access to digital devices. The ownership of digital devices decreased in size if the student was a female.

Figure - Correlation of students' performance with access to digital device

Digital Device	Girls			ICT Professional			Gender M=1, F=2
Ownership of digital device	Correlation InCourse Quiz	Correlation InClass Quiz	Correlation Cumulative Score	Correlation InCourse Quiz	Correlation Final Exam	Correlation Cumulative Score	

Own a Personal Computer	-0.11	0.12	0.06	-0.22	0.04	0.03	-0.17
Own a laptop	0.21	0.43	0.40	0.01	0.02	0.04	-0.40
Own a mobile phone	-0.17	0.08	0.02	NA (not asked)			
Own a smartphone	NA (all students had smartphones)						
Own a digital tablet	0.03	0.07	0.06	-0.03	0.08	0.114	-0.30

3.3 Pedagogical Factors

Pedagogical factors were derived from the research conducted by the Slashroots foundation on pedagogical strategy. Four key factors were evaluated: (1) course learning and facilitation that focused on access to facilitators offline and online and communication channels used to communicate with the facilitators, (2) peer learning and support and communication channels used to communicate with peers, and group interactions and practice sessions, (3) evaluation of the course content that focused on the difficulty, experience and effectiveness of the course content, (4) course technology and language that focused on the ease of use of platform and (5) self-regulation and self-directed learning. This section discusses the influence of various pedagogical factors on the successful completion of the training.

3.3a Pedagogical Issue: Course Learning and Facilitation

Course delivery was designed to facilitate in-person interactions at key points in the learning pathway so as to sustain high student engagement. It was aimed that the student / instructor instruction within the online learning space would employ both asynchronous techniques (e.g. notes or video and/or voice recordings of key learnings) as well as synchronous techniques (chat and/or real-time forums) to ensure the most effective learning experience. The assumption was that the participation of students in discussion on platforms will encourage a wide variety of cognitive and social activities. Facilitators will also benefit from determining online tools that are most beneficial to students for learning facilitation, and not providing too many options. Utilizing too many online tools ultimately creates more workload for the facilitator.

3.3a1 Access to facilitators, Girls

Course learning and facilitation support was the biggest factor influencing Girls' experience and successful completion of the course. There was an overwhelmingly positive response towards the patience, availability, and dedication of the facilitators. Girls were inspired by the facilitators and perceived them as mentors.

As expected, facilitator accessibility was an important theme that emerged from the data, and whether a facilitator was present and accessible had a strong influence on the Girls' experience. Most experiences were positive. The facilitators always remained a tangible facet of the course, accessible to the students all the time. Girls felt that the facilitators had a strong commitment towards the wellbeing of the students and were inspired by their hard work and sense of discipline. For example, some Girls indicated:

I liked that the facilitators had so much love for us. No matter how hard you made them work they were always there for you. It even made me want to be a facilitator. I realized that they reached this level because they take their time and really applied themselves to learn these skills in order for them to reach their levels of knowledge. It has inspired me to learn more.

The mentors were very encouraging. Sometimes I fell behind and we (the mentor and I) talked. They would say, "Oh! How are you still in this module? You have to work harder. You have to work faster. They were always increasing the "heat" on you.

The facilitators helped a lot. During the course, one of my grandparents died and I missed a quiz. I wrote to the facilitator and explained what happened and she made herself available to help. She even offered to meet with me here at ESIH but my schedule did not allow. They always showed that they were here for us.

I was in three different WhatsApp groups. With this last module [reference to the module on data management] I communicated with my facilitator every day whenever I needed help.

The facilitators felt the same positive energy and experience with the students:

I would say that the interaction between the students and facilitators. They (the students) really enjoyed the program. We (the facilitators) opened our arms to them. You would have to see in class during one of our sessions. Everyone is talking and getting along; it is as if we were all good friends. The energy flowed great between us; I felt that. There were 3 groups of facilitators and students, but it didn't matter. Everyone flowed among the different groups with ease

As the comments indicates, the support provided by the facilitators contributed to low attrition rate. Facilitators encouraged and supported the Girls at the time when the personal problems they faced and lag in completion of coursework could have demotivated some students and led them to drop out of the course. Many Girls also appreciated meeting the facilitators ahead of the program during the orientation session and the comprehensiveness of the session. As the comment below indicate, the session served as an opportunity for expectation-setting to better ground the applicants in the program.

Before the training launched there was a comprehensive session [orientation] when we met with everyone [administrators, facilitators]. They clearly explained what we [the participants] were going to do, how the program worked, what was waiting for us, and how we could utilize what we were going to learn. This was very positive. The facilitators were always there for us.

The positive and useful experience was confirmed by the survey respondents. 75 percent of the students agreed that they received useful feedback from the facilitators on their assignments and quizzes (2.50 percent neutral, 12.50 percent disagreed). Also, about 66.67 percent of the students agreed that the facilitators encouraged them to ask questions (25 percent neutral, and 8.33 percent disagreed) and 58.33 percent agreed that the facilitators' responses to their questions and doubts in time (37.50 percent neutral, 4.17 percent disagreed). There was a slight drop in the positive response when it came to timely response and interaction encouragement. It could be attributed to experiences where students felt simple guidance and direction to materials was inadequate and needed a more detailed explanation of the content. For example, a Girl explained:

I did not speak to my facilitator that much. I do not feel like he/she appreciated me. For example, you can ask for some information on something and he/she will tell you to read it (the course materials). So whenever I needed help I would do the research on my own.

3.3a2 Access to facilitators, ICT Professionals

Most experiences of the ICT professionals with the facilitators were positive but there was a somewhat neutral response on the effectiveness of the facilitation support.

An overall positive experience with the facilitators was reported by the ICT professionals owing to their high availability and timely response. Many ICT professionals found the support encouraging especially at the times when

students found it hard to complete the course because of personal problems. For example, some ICT professionals mentioned:

There was a time after the insecurity where I had some difficulties and fell sick. I was late on the module and facing some difficulties with the material. I called and explained the situation and he was able to make some arrangements for me in the system, so I could complete it. If you are running late, they call you to check in on you and encourage you. They don't let you fall behind.

The facilitator was very open, always available to respond to questions.

They were always available. If anyone had a problem, they were always there to help you with your needs.

My facilitator was also very helpful and willing to help us along the way. If any of us were late on a quiz he would follow up with us via a call or message.

The survey response validated the satisfaction with the availability of the facilitators. 60 percent of the security group students and 91.30 percent of the network management group students agreed that the facilitators responded to their questions and doubts in time.⁵ Further, 80 percent of the Security group students and 96.65 percent of the network management group students agreed that the facilitators encouraged them to ask questions.⁶

Unfortunately, the lack of in-person sessions with the facilitators left the ICT professionals dissatisfied despite the constant availability of the facilitators. Students indicated a need for practice sessions and in-person discussions, so they could simultaneously learn both from the facilitators and the peers and benefit from group discussions. For example, some ICT professionals mentioned:

If we had the opportunity to discuss things relating to the program. Yes, we were given an online forum that is supposed to serve this purpose, but the physical presence is more important. In this sense, I think it would have been to our advantage. The increased physical/in-person interaction between tutors/facilitators would have been helpful in working through questions and other concerns that we had. Sometimes the in-person support between each other would have been nice.

I thought there would be more meetings. We could have discussed the materials in-person with each other and debated.

The in-person/ face-to-face activities can be increased. We can organize amongst ourselves when to come in. The best option would be on the weekend because some have obligations during the day.

There was no practice and we never had in-person meetings. For example, when I read something, I only understand it at my level. But that doesn't mean I grasp it all. I need to be able to put it into context. Discussions would have helped. I assume that we did not have in-person meetings because many of the participants have studied IT in the past. It might not have been important according to them.

Lack of in-person session affected the security group more where the majority of the students (55 percent) responded neutrally when asked if they found the feedback from the facilitators on their assignment useful. Another 15 percent disagreed and only 30 percent agreed. Network Management students were more satisfied with 69.57 percent of the students agreeing to the usefulness of the feedback and 30.43 percent responding neutrally. The students of both the groups made a case for more in-person sessions to be preferably held on weekends because of the work obligations during the week.

⁵ Facilitators responded to questions and doubts in time: Security - 60 percent agreed, 35 percent neutral, and 5 percent disagreed; Network Management - 91.30 percent agreed, 8.70 percent neutral. End Term Survey.

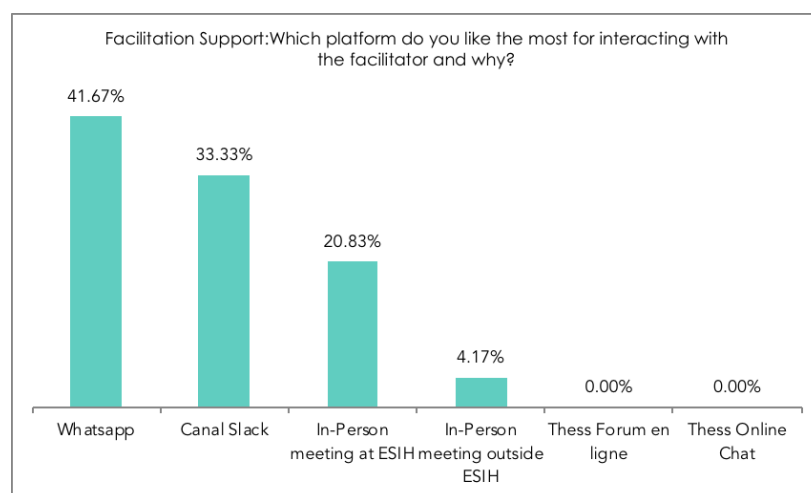
⁶ Facilitators encouraged you to ask questions: Security - 80 percent agreed, 10 percent neutral, and 10 percent disagreed; Network Management- 96.65 percent agreed, 4.35 percent neutral

3.3a3 Communication Channel, Girls

Girls preferred the widely popular and easily usable WhatsApp channel over the unfamiliar Slack channel for interactions with the facilitator. But towards the end of the course, most students shifted to Slack and recognized the benefits of a more professional interface.

The Girls used a range of tools to connect with the facilitators ranging from slack channel to WhatsApp, email, call, and in-person meeting but preferred WhatsApp (41.67 percent) the most despite the fact they had different ages, education levels, learning experiences and backgrounds. WhatsApp was closely followed by Slack Channel (33.33 percent) and in-person meetings at ESIH (20.83 percent).

Figure - Communication preferences of Girls (Source: End Term Evaluation Survey)



WhatsApp is the most widely adopted technology tools for use in social communication in Haiti.⁷ Because of its wide popularity Digicel, mobile phone network provider in Haiti, provides separate WhatsApp bundles in addition to regular data plans. WhatsApp bundles are bundles that can be used for WhatsApp only. With these bundles, customers can make voice calls, video calls and send messages via WhatsApp. These bundles come with limited data to use for WhatsApp. The lowest priced bundle is for a day and provides 25 MB of data.⁸ The wide popularity and affordable and easy access could be one of the reasons why Girls preferred WhatsApp.

Because of the familiarity with the interface and high daily usage of WhatsApp, Girls also anticipated a quicker response and found the application easier and more convenient to work with. For example, some Girls mentioned:

It was easier to communicate through platforms like WhatsApp because the response came much quicker.

I prefer to use WhatsApp because it is more affordable and accessible to all.

Facilitators also mentioned that the students were more direct and comfortable in their communication when they used WhatsApp. But despite the preference for WhatsApp, the facilitators encouraged the use of Slack by posting most of the answers and materials on Slack. This led to a gradual shift from WhatsApp to Slack as noted by a facilitator:

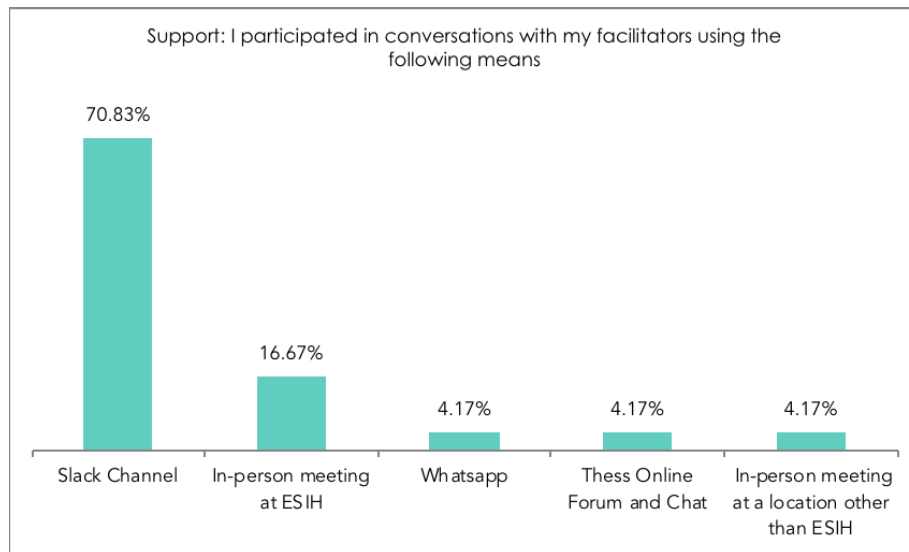
⁷ Chartsbin. (2016). Most popular messaging app in every country, [www.similarweb.com](http://chartsbin.com/view/41890), Accessed at <http://chartsbin.com/view/41890>

⁸ Digicel (2018) Accessed at <https://www.digicelgroup.com/pg/en/mobile/plans-services/promotions/WhatsApp-plans.html>

In the beginning, there were students who rarely used Slack. Some students had an issue with the notifications from Slack, in the sense that the option would sometimes deactivate. At one point I had notified them that I would only send information through Slack and this increased their usage on the platform. There were some who preferred to message me on WhatsApp, which led to me creating a group for them. They are very active on WhatsApp, some even creating sub-groups amongst themselves. I encourage the usage of groups because I tell them that more than one person may have the question.

As a result, Slack channel was reported as the most used channel for interacting with the facilitators. 70.83 percent used slack channel over an in-person meeting at ESIH (16.67 percent), WhatsApp (4.17 percent), Thess Forum (4.17 percent), and in-person meetings outside ESIH.

Figure - Communication channel used by Girls to interact with facilitators (Source: End Term Evaluation Survey)



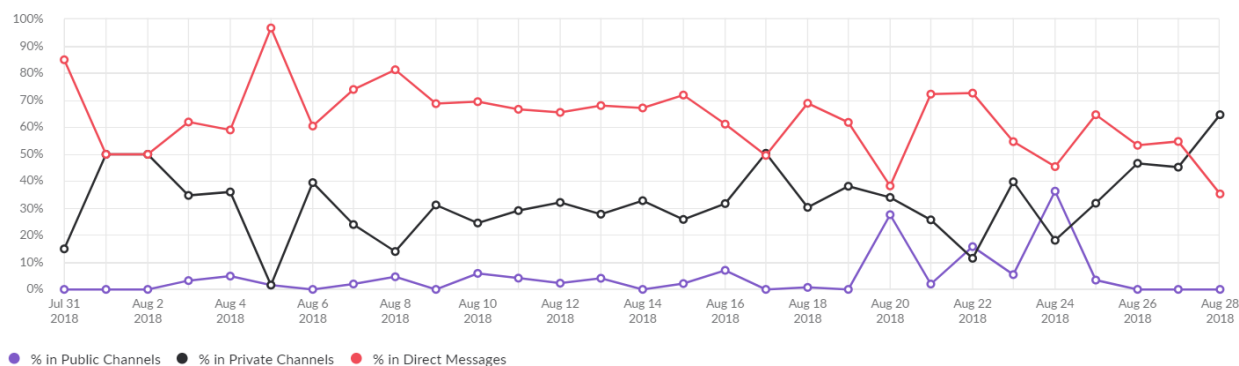
Students started using and appreciating Slack Channel more as they became familiar with the interface and recognized that direct message could also be used for instant messaging in private. A couple of Girls mentioned:

Slack brings together learners and tutors. We do not need to write our respective tutor to get an answer to a question

It motivated my experimentation via this [Slack] Channel and suddenly I learned to use it in a professional setting

The data analytics of Slack Channel shows that the use of public channels was adopted by a fair share of students only towards the end. The high use of direct messages shows the preference for privacy and the need for instant messaging among students. An almost inverse relation was seen between the use of private channels and direct messages. It perhaps indicating occasions where the facilitator posted materials on private channels shifting the conversation from direct messages to private channels.

Figure - Data Analytics of Slack Channel used by the Girls for the month of August (Source: COI)



The In-person facilitation had high response mostly because of the planned facilitation sessions and in cases where “the lack of access to a good connection to the Internet” made it “difficult to receive instant messages.” When students had poor internet connections, “face to face interaction with the facilitator interaction was [found] faster.” Only a few students used Thess platform which is not surprising given the push of the facilitator to use Slack Channel.

3.3a4 Communication Channel, ICT Professionals

ICT professionals were unable to adopt Thess forum for communication with the facilitators and naturally inclined towards WhatsApp in the absence of other more professional communication technologies.

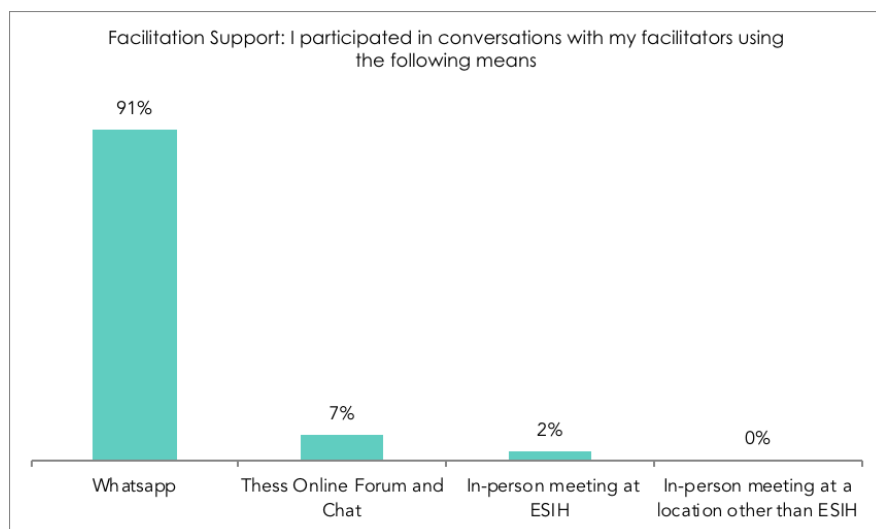
Slack channel was not introduced as a technology for communication to ICT professional students. Students naturally inclined towards WhatsApp (91 percent) to communicate with the facilitators. As a facilitator mentioned:

What they [ICT professionals] really used the most was WhatsApp... They were more comfortable on WhatsApp, so we created a group. Even if they sent a question directly to me, I would post the response in the group, so everyone would benefit.

Similar to the Girls, ICT professionals students preferred WhatsApp because of the familiarity and high daily usage. They also anticipated a quicker response and found the app easy to use as indicated by the comment below:

We received the bulk of assistance and communication on WhatsApp. If you had a question and you wrote to them, you received a response.

Figure - Communication channel used by ICT professionals to interact with facilitators (Source: End Term Evaluation Survey)



Only 7 percent of the students communicated over Thess Platform. This was despite the efforts of the facilitator to activate conversation on the platform. For example, one of the facilitators indicated:

I had to develop a strategy to increase their participation in the forum. All the additional information that I shared was through the platform. I would post on WhatsApp that they needed to refer to the forum to access the materials. I looked at WhatsApp as a quick communication [or notification] method.

The comments indicate that the interaction on Thess Platform was mostly forced and students preferred the ease and convenience of WhatsApp over it. Some students suggested using interactive activities that are graded to activate the platform.

I feel as though the forum was nonexistent, but we are the ones what should make it existent!

This question [did you use Thess platform?] depends on personal traits not so much the platform itself. Maybe the facilitators can pose more questions on the forum. A solution can be that the tutors ask us [the students] questions through the forum and we can respond. Maybe if we were graded on our usage rates of the forum it would encourage the participants to use it more.

The interactions through in-person meeting were just 2 percent which is not surprising given no in-person sessions were planned for the ICT professionals as part of the program.

3.3b Pedagogical Issue: Peer Learning

The research conducted for program design had recommended encouraging student collaboration program through dynamic activities including group work and team sprints to facilitate peer learning and development of cognitive and social skills.

3.3b1 Peer Support and learning, Girls and ICT Professionals

Students sought moral support from their peers and helped each other to improve comprehension of the course content.

The evaluation study confirmed that peer interaction facilitated learning. 50 percent of the Girls reported that peer learning improved their understanding of the course. For example, one of the Girls mentioned:

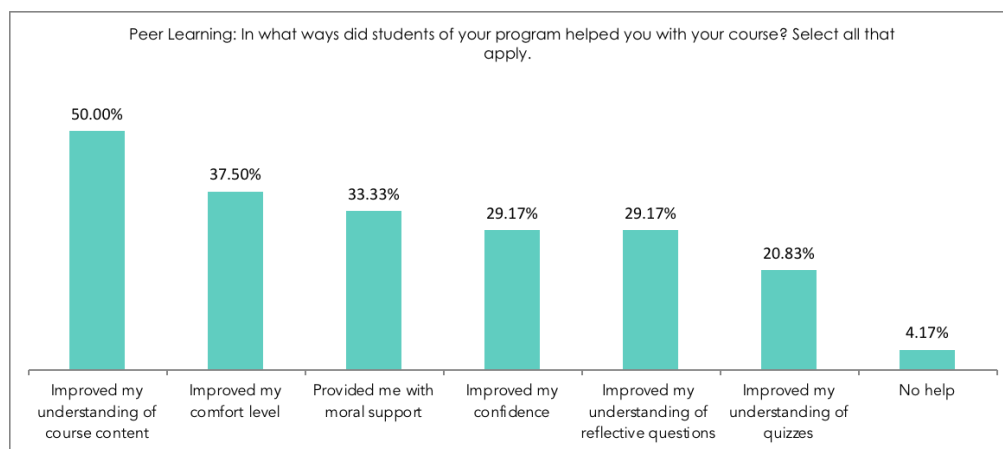
My sister is a student who happens to be in the program as well, Melissa. Every day we worked together, we shared my laptop. Everyday once I returned home, I would ask her what she accomplished. She had a very low understanding in the beginning. It was I who worked with her. I taught her about managing emails, responding to emails, formatting, etc. When it came to statistics it was very hard for her. I feel that that particular lesson/module required some prior college classes. Melissa had many problems when it came to variance, mode, mean, etc. This is where I helped her the most. Before she would use a calculator then type the results. I showed her to write formulas in the cells. If I weren't in the course, she would have dropped out.

The comment indicates that some students supported their peers by explaining what their peers cannot understand or know nothing about. There was also a sense of kinship among the Girls: 37.50 percent reported that peer interaction improved their comfort level, 33.33 percent said peers provided them with moral support, and 29.17 percent said peer interaction improved their confidence. Girls also liked to discuss reflective questions and quizzes to increase their understanding.

There was a lot of support between/among each other, even if you did not ask for it.

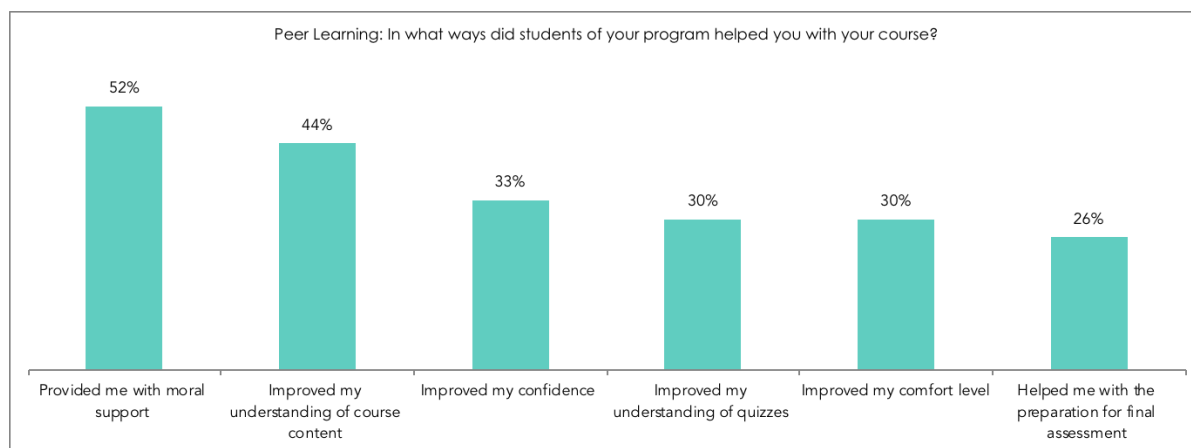
Yes, I would meet with some classmates. In one instance I was having a problem with my computer and had a meeting with a classmate and they were able to help with the problem.

Figure - Influence of peer learning on Girls (Source: End Term Evaluation Survey)



ICT professionals sought for moral support from their peers first and foremost (52 percent). Other students reported receiving help to understand the course content (44 percent) and quizzes (30 percent) better. Students also reported improvement in their comfort level (30 percent) and confidence level (33 percent) as a result of peer interactions. Some students sought their peers to prepare for their final assessment.

Figure - Influence of peer learning on ICT Professionals (Source: End Term Evaluation Survey)



3.3b2 Communication Channel, Girls and ICT Professionals

Students preferred and used WhatsApp the most to communicate with peers.

Majority of the Girls reported using Slack (45.83 percent) as a means to participate in conversations with their classmates followed closely by WhatsApp (25 percent). Some students also met in-person either at ESIH (16.67 percent) or outside ESIH (4.17 percent). None of the students used Thess platform despite access to it which is not surprising given students were encouraged to use Slack by the facilitators.

We communicate on the channels that were established for us, to facilitate communication with the other young women.

While Slack Channel was reported to be used most for peer interaction, Girls also often communicated in small groups through WhatsApp. For example, some Girls mentioned:

All of us, all fifty did not communicate that much on Slack, we would set up group chats on WhatsApp and we then share the info on Slack, and sometimes on Facebook. Or you can set up in-person meetings with some people.

The trend was similar when it came to technology preference for communication with peers among ICT professionals. Thess platform usage (9 percent) and in-person meetings at ESIH (5 percent) was low and the majority of the students (86 percent) used WhatsApp. The students saw the WhatsApp group as a community that supported learning facilitation in the form of support and encouragement.

WhatsApp was the main and easiest way to communicate. They are very interactive.

When it comes to WhatsApp, we need not say anymore because we really over-utilized it.

I found the most support between students (camaraderie) on the WhatsApp group. One helps the other.

We communicated mostly through WhatsApp. I was trying to encourage people to use the platform forum and I noticed the facilitator doing this as well. At one point I even posted a question and the forum and didn't receive any responses. But we are very active on social media. We have even created our own groups within groups in order to communicate with each other. But I would rate the forum a 2/10, I am sure of that.

Although the students did not report meeting in-person outside ESIH through the survey, some students mentioned meetings with their peers at the focus group.

A friend in the course and I usually met one-on-one usually at our homes or an agreed upon location to discuss what was going on and any issues that we had.

Sometimes it would be in-person/face-to-face but easiest online. We do not have to meet here at ESIH. We could meet anywhere.

We would meet in-person or at work [her colleague was also a participant]. For example, yesterday at work we were preparing for the exam.

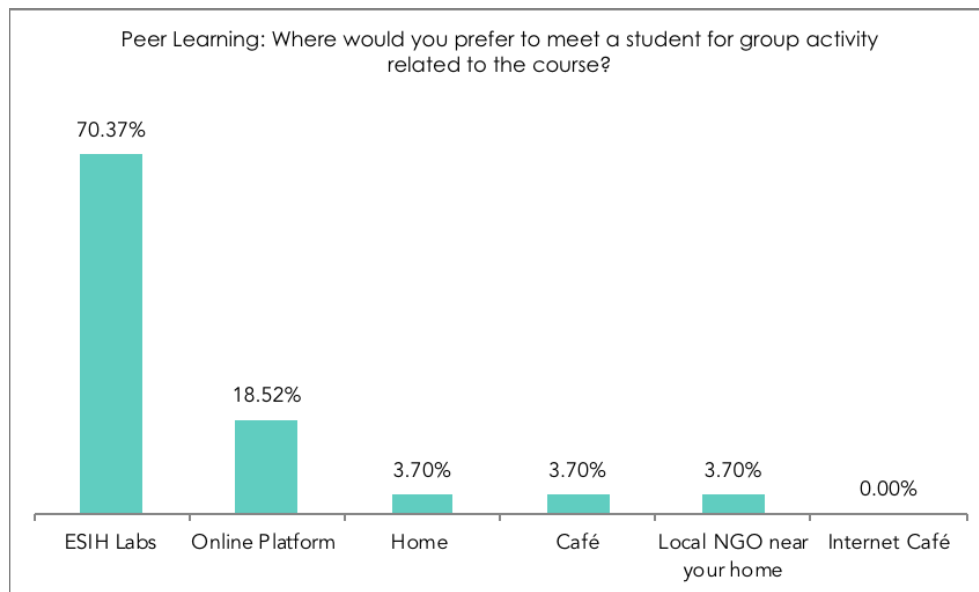
3.3b3 Group Interaction, Girls and ICT Professionals

There was a unanimous desire among both Girls and ICT professionals for an increase in opportunities to interact with their peers.

Most students felt they were encouraged to interact with their peers: 58.33 percent of Girls and 69.57 percent of Network Management students agreed to the statement. But security group students had a less positive response with 40 percent responding neutrally and 15 percent disagreeing. All the groups had at least one-third of the students responding neutrally and about one-tenth disagreeing.⁹ And when asked if they wanted more opportunities to connect with their peers through group activities. All of the students responded with a resounding 'yes'.

When asked where the students would prefer to meet for group activities, the ICT professionals indicated a strong preference towards ESIH Labs (70.37 percent). Only a few students selected online platform (18.52 percent) and even fewer students selected cafe (3.70 percent), home (3.70 percent), or a local NGO (3.70 percent). Nobody selected an internet cafe.

Figure - Location preference of ICT Professionals for group activities (Source: End Term Evaluation Survey)



3.3b4 Group Practice Sessions, Girls

⁹ Response to 'I was encouraged to interact with my peers' - Girls: 58.33 percent agreed, 33.33 percent neutral, 8.33 percent disagreed; Security: 45 percent agreed, 40 percent neutral, 15 percent disagreed; Network Management: 58.33 percent agreed, 33.33 percent neutral, and 8.33 percent disagreed.

There was a consensus among all the Girls on the need for more practice sessions to better ground themselves in the coursework.

The facilitators met with the Girls in-person almost every weekend. As a facilitator's comment below indicate, the sessions happened every weekend as planned in the first month, but the frequency gradually shifted to every other weekend. The practice sessions were less often and not planned at the beginning.

In the very beginning, in the first month we met every weekend. After the first month we switched it to every other weekend. There were only 3 or 4 weekends where we did not meet. We met together often enough. If there were a scheduled meet up where the students did not attend, they would send an excuse via WhatsApp, etc. The meet ups were generally scheduled in advance on the calendar. Only the practice sessions/meetings were not fixed at the beginning as it depended on the schedule/availability of the facilitator.

Most Girls desired for an in-person projector session for students and facilitators to discuss the module exercises together. The desire for an in-person practice session was particularly noted for the last module on data which was considered most difficult. For example, some Girls noted:

There was a lack of practice. I thought that they would start in the second module. The material was good but this [practice] is what I expected. They even gave us a tablet to do this, but we did not have much practice.

I had a similar problem with that module. I think if we would have had the opportunity to do it in a classroom we would have assimilated more. Out of us 50 girls I do not think half could say they improved/are better. We need more assistance and practice. We need more projections/classroom sessions so that everyone could work on a computer.

There should be more practice. You can really see/discover what you are learning through the practice examples. I learn faster through practice than I do through theory. In this field, practice is very important. Even though there are people that help [the facilitators], it is not the same.

The practice was the most useful. Yes, the theory is there but it is the practices that will allow/show you to complete the task well.

But the facilitators noted otherwise indicating that even when set-up was provided for students to come to the ESIH lab and practice more, no students came.

We had some scheduled practice sessions. ESIH had opened their doors to us for this purpose. During the module on DATA we had access for the entire week, but the women only came once. I am not sure if they were aware of this opportunity. I had written to them with a specific date and time (rendezvous) but no one came.

One of the Girls rightfully noted, that the desire for more practice was rooted in the fact that most lack access to a computer with reliable internet to practice the topic. Additional in-person might not be the only solution and a combination of more online step by step guidance and provision of lab could also be an alternative.

The practice does not necessarily have to be in a class. It is a technological problem but doesn't need a person in front of you to fix/help. This is an online course. You see that there were many challenges in trying to find convenient days/times for meetings. Everyone's schedule is different, and it is not always convenient to travel to ESIH. The problem was not that you didn't receive help for the module; the problem was that you did not have access to a computer to practice the topic. This is not a matter of in-person assistance.

There will always be a thing that is difficult. For someone living in Haiti I do not think the methodology was good. Yes we have a tablet and/or a phone but to really integrate ourselves into the program we would need to meet more in-person.

3.3b5 Scenario-based Practice Sessions, ICT Professionals

The ICT Professionals unanimously expressed disappointment at the lack of simulations and scenarios-based exercises. They felt they were not able to apply the theory they learned through practice sessions leading to low level of confidence in the potential to apply the skills learned.

All ICT Professional students had a college degree in computer science and were well-versed in the theory of the subject. Their expectation from the course was that it would teach them applicable skills that they can use in their current or prospective jobs through problem solving or scenario-based exercises. But most found the practice lacking in the exercises that can take them beyond theory. For example, some ICT professional students noted the need for more practice or use of videos to increase comprehension:

Ok to compare normally we spend 4 years only studying. Initially I thought there would be a section on theory and a section on practice. But, this is not what I found although it was what I hoped/waited for. We did not find any practice options whatsoever. We spent three months with a focus on studying only without any practice options.

I don't know if they (Administrators) plan on adding practice sessions, remain purely theory based, or become a mixture of the two. I would like, as I said before, for the practice/problem solving to start from the very beginning. For example you can make a practice scenario and we can apply the topics learned such as domain names, where to place servers, etc.

Coursera has more practice. This can be more mixed (reading materials and practice).

As we've stressed before, additional practice instead of just theory. Other than that, everything was good.

As we said before the practice examples to increase comprehension. Videos also.

Some students gave specific examples from the course work where there was more need of practice such as Security Logic and Surveillance:

For security section there is a module, I believe it is #4 "Security Logic" that spoke/detailed purely practice techniques (protocol, configuration etc.) but we didn't have the opportunity to apply the techniques learned through the course nor quiz. It would have been better to actually practice this module/topic.

Generally, it is impossible to master the information solely by reading. For example, there were some tools that were mentioned that are used in surveillance. If you are unfamiliar with these tools you cannot say that you learned.

Suggestions were provided by the ICT professional students on how the practice can be integrated with the course. Some students mentioned the use of videos like in Coursera as indicated in the comments above. Other students mentioned introducing a familiar and contextual example early on in the course and build upon it with each module:

In terms of the content, I think that we need to have scenarios for practice. It would be best if these practice opportunities built upon one another. For example, it could be introduced earlier in the modules/course and each new module would add/build upon the same scenario.

In my section there was a topic that I was unfamiliar with and so I asked the facilitator for an example, and the one he gave was very good. He said to think of it as if someone is travelling from Carrefour Airport to a certain destination and the term refers to the traffic that you encounter on the route there. I think that this explanation allowed the student to better understand the question.

I don't know if they (Administrators) plan on adding practice sessions, remain purely theory based, or become a mixture of the two. I would like, as I said before, for the practice/problem solving to start from the very beginning. For example you can make a practice scenario and we can apply the topics learned such as domain names, where to place servers,

etc. It is odd that the final exam was practice based since all we studied was theory. The course should have been like this.

Other students mentioned internship as the opportunity through which the students can learn to utilize the skills and be more confident:

An opportunity (like an internship) for us to see how the programs we learned are utilized right in front of us. We only did theory

However, if we had the opportunity through an internship to utilize the tools in a real environment, to see first-hand how the configurations are handled, to ask certain questions it would help. I can't say that I learned at 100 percent without the opportunity to practice.

An improvement would be an opportunity for an internship. I don't know if the Administrators have partnerships with local businesses/enterprises that can facilitate this. The majority of us participants are young professionals are just finishing with school and this would give us an opportunity to improve our competence in terms of usage/usability of the things we learned.

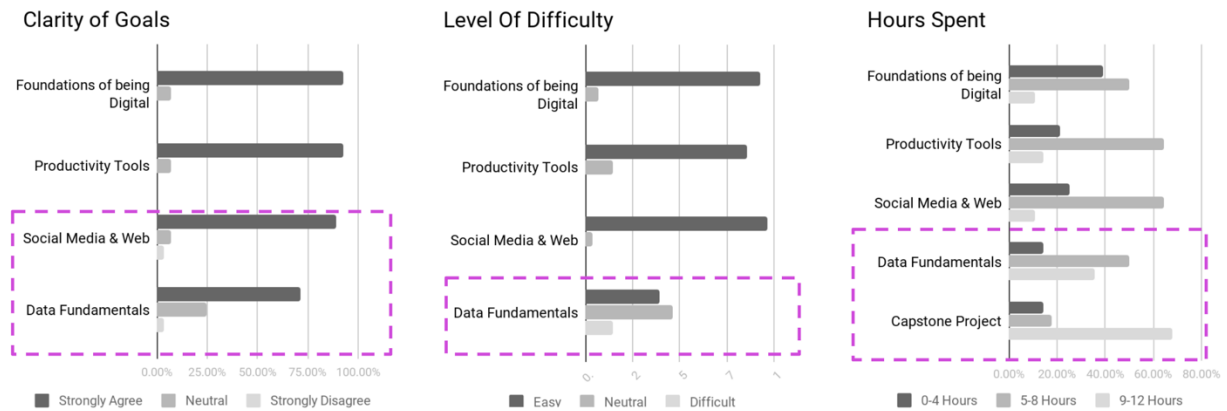
3.3c Pedagogical Issue: Evaluation of the course content

3.3c1 Course Effectiveness, Girls

With Girls, the perceived effectiveness of the module decreased with increased difficulty. But they found the more difficult modules – data fundamentals and capstone projects – useful and desired more practice sessions and time to better ground themselves in the two modules.

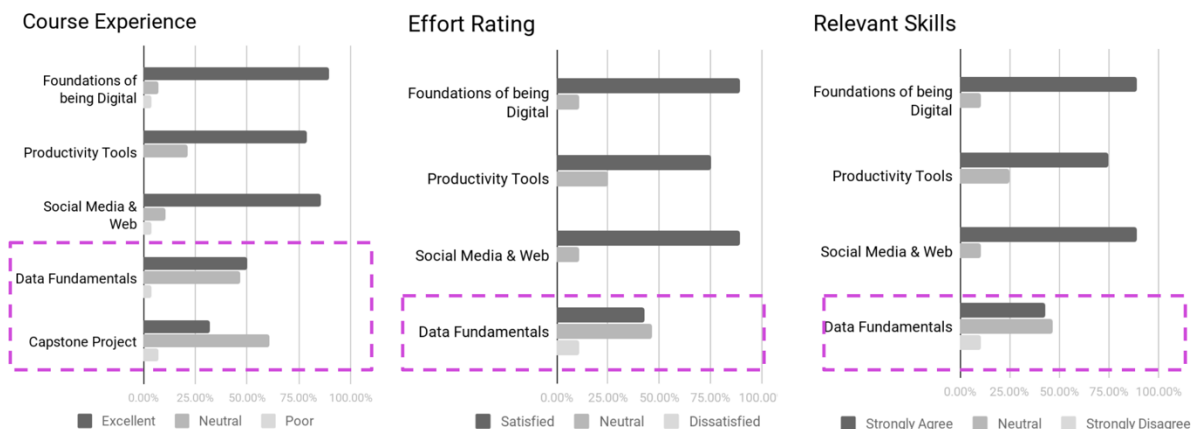
The course content was evaluated based on multiple parameters: level of difficulty, experience, and effectiveness. To assess the difficulty of the course, as experienced by the Girls, three parameters were considered: clarity of goals, level of difficulty and hours spent on each module. First, the Girls were asked if the course goals, learning objectives, and outcomes were made clear to them at the beginning of each module. Second, if the course material covered was at the right level of difficulty for them – easy, neutral, and difficult. And third, average number of hours they spent per week on the course, including completion of the quizzes and other course-related work. It was evident from the survey response that students found the Data Fundamentals and the Capstone Project most difficult. One fourth of the class did not agree that the goals for data fundamental course were clear. In addition, a vast majority responded neutral or difficult to the level of difficulty to the data fundamentals course. This is in stark contrast to the other courses where majority of the students found the modules easy. A look at the average number of hours spent show that most students spent between 5-12 hours on data fundamental course and 9-12 hours on the capstone project.

Figure – Course difficulty for Girls (Source: Mid- and End-Term Evaluation Survey)



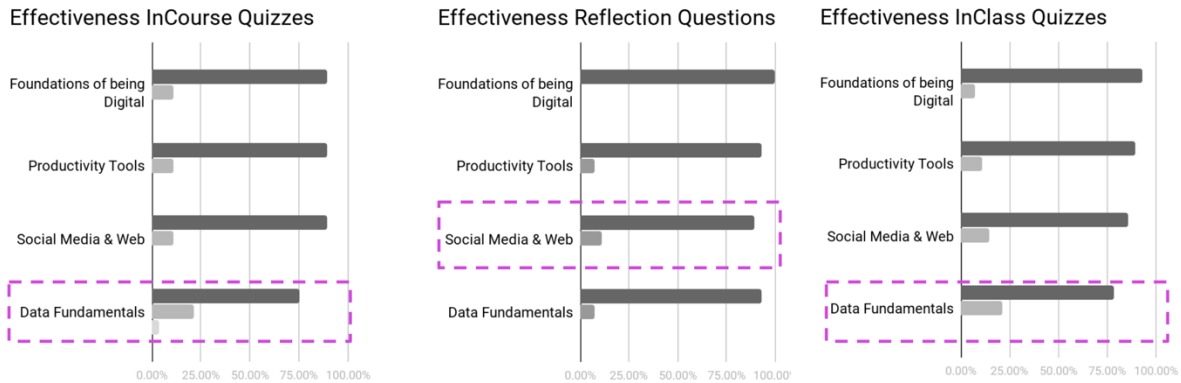
The level of difficulty seemed to be directly related to the experience of the course. Majority of the students rated the course experience as neutral for Data Fundamentals and Capstone projects. Most students also responded neutral to the satisfaction with their effort in the course and the relevance of the skills learned through the data fundamental course.

Figure – Course experience for Girls (Source: Mid- and End-Term Evaluation Survey)



Not surprisingly, similar pattern was seen in the rating of the effectiveness of quizzes and reflection questions at the end of each module. There was a slight trend towards an increased neutral response with the increased difficulty of the course.

Figure – Course effectiveness for Girls (Source: Mid- and End-Term Evaluation Survey)



Focus group discussions confirmed the high level of difficulty of the data fundamental course but also revealed that the Girls enjoyed it the most as it challenged them. The Girls desired more practice sessions to better comprehend the module.

I had some difficulties when it came to manipulating data on the online applications. I would suggest that the next time the facilitators hold some sessions where they go through exercises on a projector with the students first.

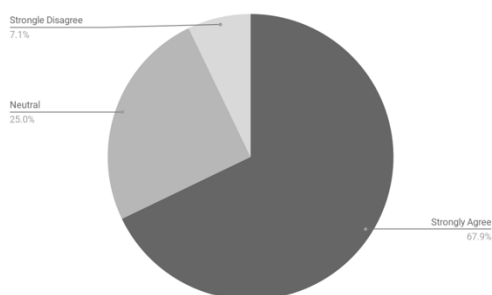
The 4th module. That is the one that challenged me.

For me, it all went well. I really enjoyed the module on Data Governance.

What was difficult for me was the work regarding databases. Initially I thought I was better than I actually me. I need to improve and become better.

Similarly, the majority of the students found the capstone project effective in reinforcing the skills and knowledge acquired through the four modules. 67.9 percent agreed that the course taught them relevant skills.

Figure – Course experience for Girls (Source: Mid- and End-Term Evaluation Survey)



They appreciated the project for its ability to bring students together, enhance problem-solving skills, and encourage more practice. Students desired more time to complete the project.

This was an opportunity to demonstrate the knowledge and skills acquired throughout the four courses that preceded, and it was very effective in improving our online digital competence...

I was not really satisfied with the project, it took three weeks yet were only granted two and a half weeks...

It gave us an idea of what our manager will expect from us, the skills required, and the mistakes to avoid...

While not revealed through the survey responses, the Girls mentioned the difficulty of being able to practice stenography session on tablets.

The typing/stenography is still difficult for me. I still cannot type without looking. I see that if I don't practice everyday I will not acquire this skill.

The Girls found the first three modules comparatively easy mostly because they were already familiar with the subject. Students specifically mentioned the Social Media and Web as being common and easy.

The first module was easy and so was the one that was focused on social resources (applications)

Using Facebook and other social applications is common, so the related modules were easy. But it is more difficult regarding the other programs and exercises.

The quizzes at the end of the modules were easy.

The second module was easy for me.

But it was the courses which they perceived thought them skills they could apply in real life that they really enjoyed. The Girls mentioned the usefulness of learning the google sheets and forms and managing databases, not just for more employment opportunities, but to be able to apply them in their day to day activities.

I really enjoyed one of the last lessons. We had to download a form and it was like we had to do a survey and conduct research.

In the program, I liked the activities that had to do with Google Sheets. I have noticed in my internship, and other businesses in Haiti, it is excel that is widely used. The majority of the enterprises use excel. It is important for us to learn how to manipulate the data, how to sort, and more.

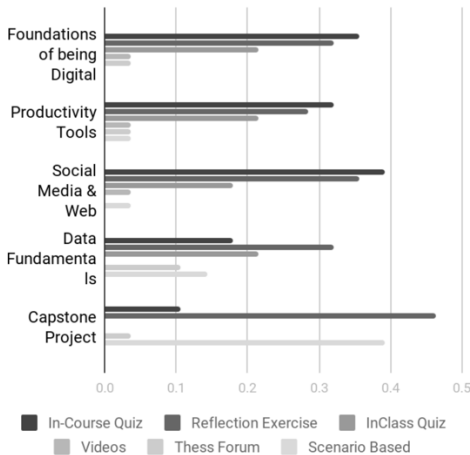
I liked them all. Each the modules were necessary form the intro to the last course. We were taught the basics, such as what exactly the internet is to more useful things like how to protect data. Each had its place.

Managing databases was the most useful topic for me. No matter where you go Excel is a major component.

For me it was the last module. I really want to perfect my abilities to use the digital processing applications (Google sheets etc.). I want to perfect my skills in charts and diagrams. This was the most interesting class for me.

In course quizzes and reflection exercises followed closely by in-class quizzes were found to be the most influential learning activities. Variation was seen in data fundamental course where in-course quiz was found less influential than reflection exercise and In-class quiz. Some students also found online sessions and scenario-based learning more influential. As expected, reflection exercise and scenario-based learning was found to be most influential in capstone project.

Figure – Most influential learning activity for Girls (Source: Mid- and End-Term Evaluation Survey)



3.3c2 Course Effectiveness, Network Management and Security Students

The course experience was rated low for courses that were perceived to be more difficult.

Overall the ICT professional students found the course content and its composition well defined and easy to follow. Many students mentioned that they had not heard of many topics exposed to them through the course and the ability to build beyond their existing knowledge was considered as a positive aspect of the program as indicated in the comments below.

The documents. The explanations were good. You are able to get a good context and it is not difficult to follow. It was clear enough that if you were not familiar with IT you would be able to follow.

What I found really well was the composition of the materials. The materials were very well defined and explicit. I would like to congratulate them (the content creators/developers) on that. Even the quizzes were good. It was extremely well presented and prepared.

Also, there are things that I can say I learned such as good practices that I did not know beforehand.

Not so much that it was easy, but the documents were so well elaborated that even if you didn't have prior knowledge you were OK. It is the key positive aspect in the program.

The training materials were great. While doing some research on my own, I compared the course materials with the materials I found online. Our program materials were superior. Some of the other materials even came from France universities. I was impressed.

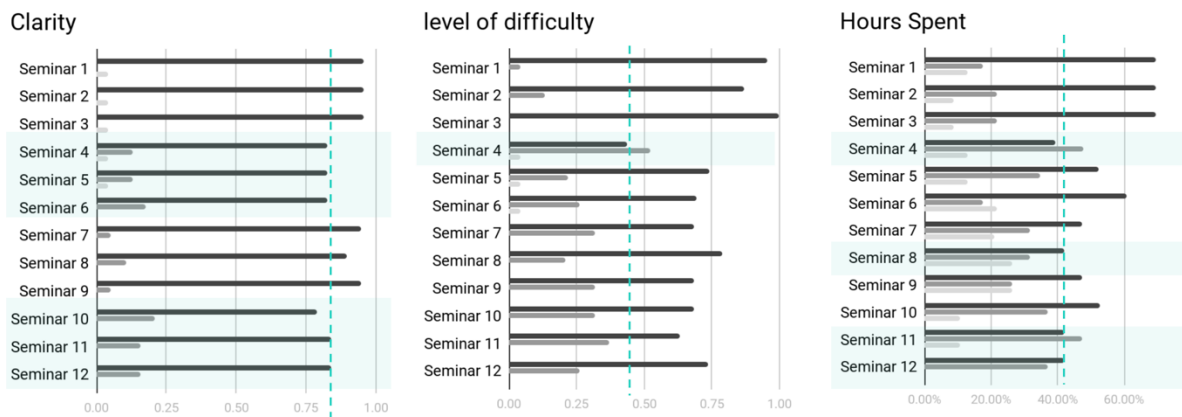
Few students found the course materials condensed and desired further breakdown of chapters.

The materials are too condensed/heavy. The chapters are too comprehensive. Perhaps it can be broken down. For example, let's say a chapter is 52 pages, by the time you are done you have forgotten some of the information from the beginning of the section. Then when it is time to complete the quiz the questions can be from any section of the chapter, and you can't refer back to the materials. The chapters can be broken down into mini-sections (1.1, 1.2, and so forth) and each mini-section could have a mini-quiz that corresponds to that particular section. And when you are done, there can be a more thorough quiz that encompasses the entire chapter.

Unlike Data and Practitioner course for the Girls, a stark contrast in the level of difficulty, experience, and effectiveness was not observed in the survey responses for the ICT professional courses. But patterns were observed with certain modules and listed below.

Network Management: But some relative difficulty was indicated - Seminar 4 was considered most difficult overall, and seminar 4-6 and 10-12 were reported to have less clarity in learning goals and objectives. Students spent most hours in seminars 4, 8, 9, 11 and 12.

Figure – Course difficulty for Network Management Students (Source: Mid- and End-Term Evaluation Survey)



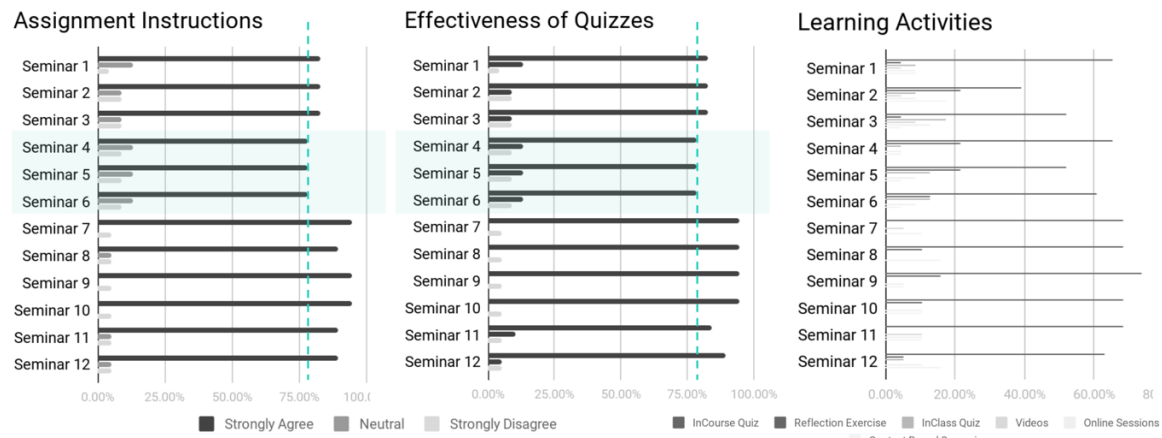
Students had less positive experience in Seminar 4 and 5, most students rated the experience and satisfaction with their effort neutral. Students also found the effort to be neutral in Seminar 6 and found the skills taught in Seminar 4, 5, and 6 to be less relevant.

Figure – Course experience for Network Management Students (Source: Mid- and End-Term Evaluation Survey)



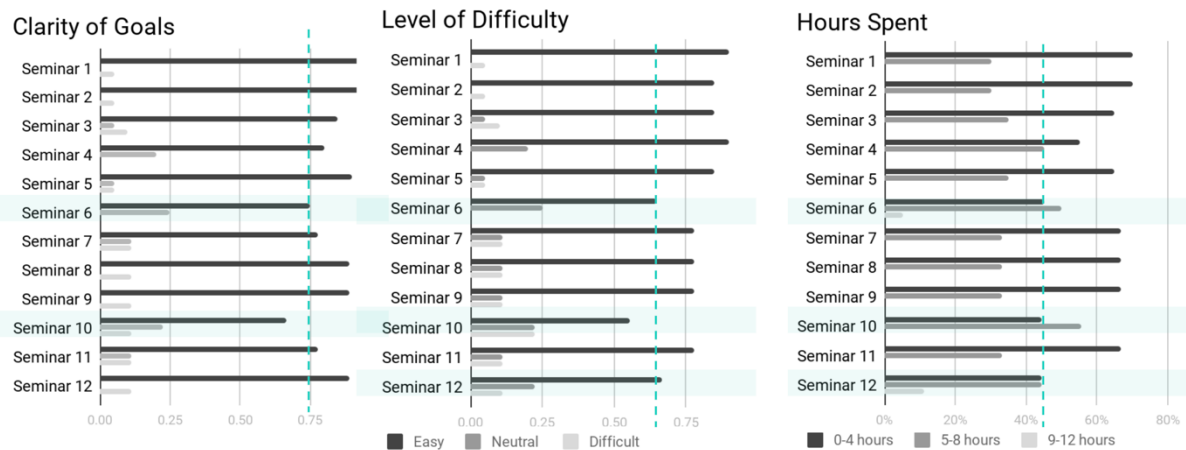
Seminar 4, 5, and 6 were also reported to have less clear assignment instructions and less effective quizzes. Overall, incourse quizzes were reported as the most influential learning activity.

Figure – Course effectiveness for Network Management Students (Source: Mid- and End-Term Evaluation Survey)



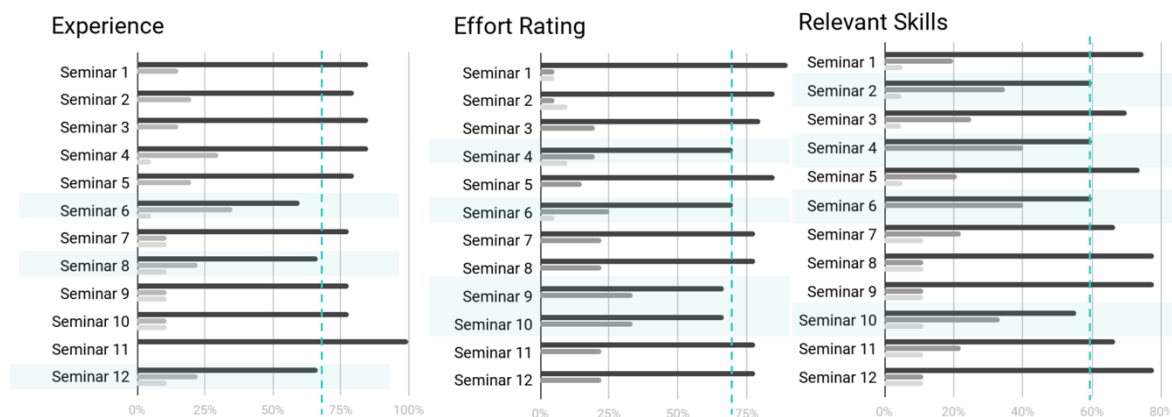
Security Course: Students spent most hours in Seminar 6, 10, and 12 which were also considered more difficult. Seminar 6 and 10 were also reported to have less clarity of learning goals and objectives.

Figure – Course difficulty for Security Students (Source: Mid- and End-Term Evaluation Survey)



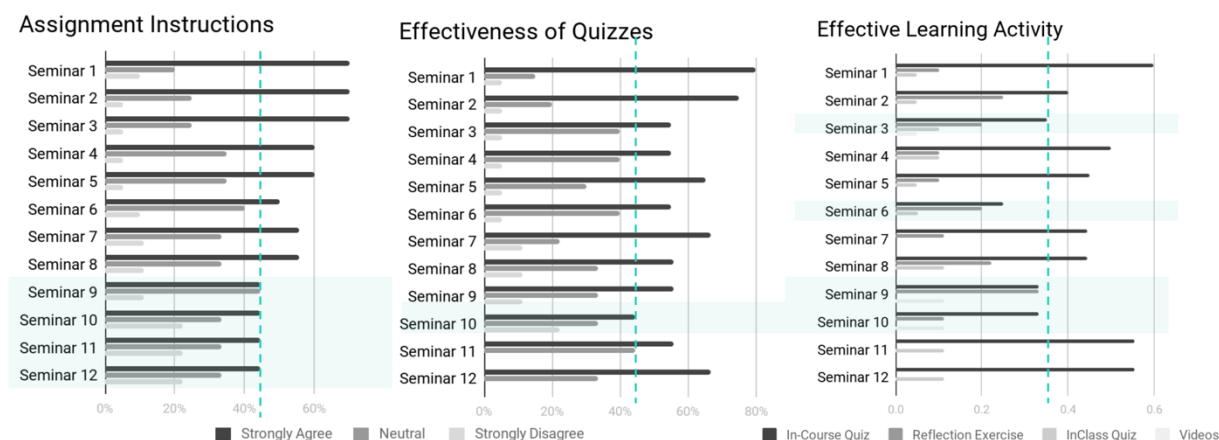
Students had less positive experience in Seminar 6, 8 and 12 and were least satisfied with their efforts in Seminar 4, 6, 9, and 10. Students perceived that less relevant skills were taught in Seminar 2, 4, 6, and 10.

Figure – Course experience for Security Students (Source: Mid- and End-Term Evaluation Survey)



Seminar 9 – 12 were reported for less clear assignment instructions, and seminar 10 incourse quizzes were considered less effective.

Figure – Course effectiveness for Security Students (Source: Mid- and End-Term Evaluation Survey)



Overall, in both network management and security course, ICT professionals found the initial chapters easy because they covered the base knowledge already studied in the undergraduate programs. A desire for more content on topics that were less dense and more challenging quizzes was indicated in the comments of the students as well.

Chapter 2 was very easy for me to follow.

The section that had MLAN, etc was very easy. The content was only 16 pages or so.

The easiest module/section was module 1. These were base techniques/topics that we all should have known.

The section on “virtualization” was not enough, just 12 pages. It was as if you simply blinked your eyes and you were done.

It is odd that the final exam was practice based since all we studied was theory. The course should have been like this. Also, I find that the quizzes were too easy. It is as if you can simply skim the reading materials and learn enough to pass the quiz. It is not challenging enough or calls for critical thinking and reflection.

Students exhibited high level of awareness of topics that were more relevant to job mobility. At the same time, some topics were indicated to be less relevant. Several topics were called out as indicated in the comments below.

There was information provided that shows you how to manage the information/information systems of various institutions. I would say 60 percent of what I learned can be applied to what I am currently doing/working on.

Network Surveillance and NOC were two topics that were new to me. But I have come across many of the other module/course topics before. These were topics that were not addressed in my previous studies at Infortronic.

I would have liked additional focus on Cisco, it is a very important resource in these times.

The training itself was the most useful. The knowledge module on Surveillance because I would like to be an Administrator, I would say the same regarding Surveillance. Also, NOC and good practices. I got a lot out of them.

There are some modules, such as the one that elaborates on the internet, is not necessary.

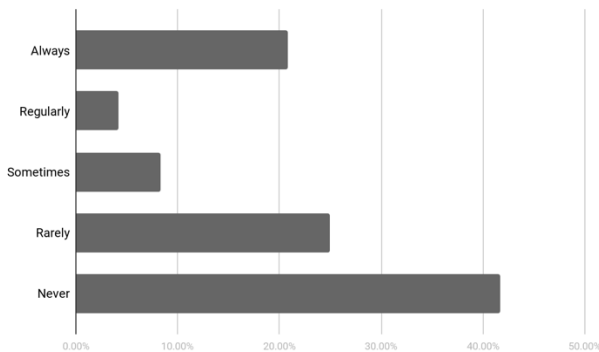
3.3d Pedagogical Issue: Course technology and language

3.3d1 Language and Course Technology, Girls

All the Girls used tablets to access the course material and used French as the language of instruction. Besides the initial technical problems encountered with downloading apps on the tablet, the students found course navigation and use of platform easy.

Most Haitian students complete their education in French but the verbal communication between instructors and students is usually in Haitian Creole. A decision was made at the time of program design to provide the course in French and keep verbal instructions in Haitian Creole to increase the ease and have low attrition. At the same time, Girls were provided the option to switch the language between French and English on the ADAPT platform. While all of the students selected French as their language of instruction, a majority of the students (59 percent) switched language atleast once with over 20 percent of the students always switching between the language of French and English.

Figure – Frequency of language switch on ADAPT (Source: Mid-Term Evaluation Survey)



Over two thirds of the students found access to course material flexible and convenient (79.17 percent agreed). But few students had trouble accessing the platform (16.67 percent neutral and 4.17 percent disagreed). For example, some Girls indicated:

In the beginning of the program my tablet had a hard time accessing the platform. When completing the quizzes I had to keep a pen/paper handy. It was an inconvenience.

Yes, I had trouble accessing the platform the first time I was working on the module.

Sometimes I can not find the option for “typing” and it calls for a lot of patience.

I had problems with downloading from the tablet. For example, there are 4 modules but when I was completing the second module I was repeatedly asked to download the materials and I could not finish it.

There was also an issue with the google sheets. I found that when I was done with courses and I had to complete the evaluation, I briefly exited but when I returned I had to start all over again. It was as if I did not complete a portion.

There were some challenges with the tablets because they could not use the Google Play Store. The students had to go on the Amazon store to purchase the applications. Moise helped with this issue. Ultimately we were able to access the

Playstore for the needed applications but students were not too familiar with the applications. At this point some had used up the memory capacity on the tablets. In the end they become comfortable with the applications.

For most of the Girls, the trouble accessing the platform was mostly in the beginning. With others, the trouble was related to technical difficulties of not being able to locate and perform some functions. The courses were delivered under a tight deadline with not enough time for quality assurance that also led to some technical bugs that cause frustrations among the students and take up more time than anticipated to finish a task. Most of the students reported that they had adequate technical support from the facilitators when they encountered such technical difficulties (75 percent agreed, 20.83 percent neutral, 4.17 percent disagreed) Majority of the students also found the navigation through the course content logical (83.33 percent agreed, 16.67 percent neutral) and the format and page design of the course engaging (95.83 percent agreed, 4.17 percent disagreed).

3.3d2 Language and Course Technology, ICT Professionals

ICT professionals navigated the course only in French, with no option to use any other language. The technical challenges were mostly owed to the functionality of the quizzes.

The ICT professionals did not have the options to switch languages between English and French. A majority of the students found access to course material flexible and convenient (84 percent agreed). Only a few students responded neutrally to the query. While a vast majority of the network management students found the course content to be logical (86.96 percent agreed, 13.04 percent neutral), about one third of the security students responded neutral (70 percent agreed, 30 percent neutral). A similar pattern was observed in case of adequate technical support from the facilitators where one third students of the security course responded neutral (65 percent agreed, 35 percent neutral) compared to one fourth of network management students (73.91 percent agreed, 21.74 percent neutral, 4.35 percent disagree)

The technical challenges were mostly owed to the functionality of the quizzes. A lot of students had to restart the quizzes multiple times due to a bug in the program. Some students also expressed frustration at not being able to refer course materials while completing the quizzes.

The functionality of the quizzes must also be adjusted. While taking a quiz, if you do not answer correctly you have to restart. Additionally, there was once an issue when I selected an answer but it was not registering by the system. I was continuously prompted to select an answer, but I already had.

There was a similar error in the quiz for virtualization/virtual machinery.

It is not exactly stress or frustration, but there were errors regarding some questions that had little to do with the materials. For example PRRS, there were questions but when consulting the materials the answers did not correspond. When completing the quiz an answer was validated but I can tell that it was not the appropriate response. I reported this to the tutor.

Regarding the quizzes, there is no way to refer to the materials while completing the quiz. I've taken online courses in the past where you can view both the materials/notes and actual quiz at the same time.

LACNIC had provided the course materials on pdfs and used graphic content to make the content appealing. The pdfs were uploaded on the THESS platform. A majority of the students found the format and page design engaging (Security, 65 percent agreed, 35 percent neutral; Network Management, 73.91 percent agreed, 26.09 percent neutral).

3.3e Pedagogical Issue: Self-regulated learning

Lack of direct support and structure that come with classroom learning can often lead to high dropout rates in online courses. To increase retention rates, online and in-person facilitator support was coupled with course design and delivery that maximized on the characteristics of an adult learner: allowing autonomy and being goal-oriented. The curriculum design and delivery also aimed towards encouraging the culture of “self-evolving student” through the use of technology-driven and regularized self-assessment sessions to equip the students with the necessary resilience and objectivity to adapt within the professional world.

3.3e1 Self-regulation and self-directed learning, Girls

Girls were encouraged by the goal-oriented and autonomous character of the curriculum design. The access to course schedule in advance, ability to track grades, multiple attempts at quiz, and links to outside materials played an important role in instilling a culture of self-regulation and planning in Girls.

Majority of the Girls enjoyed the autonomy and felt it instilled a culture of self-discipline and planning in them. The access to course schedule in advance and the ability to track and evaluate their performance through the grades that were regularly posted allowed the Girls to set targets for themselves and work hard to achieve those targets. For example, some Girls mentioned:

I did a lot of the work on my own. I would ask Berlyne for help. But, I tended to concentrate and focus on my own.

I liked the self-education/self-regulating aspect (auto dictate). I learned a lot about myself. I had to employ a lot of self-discipline. You learn how to regulate and manage your time and use Google calendar.

I knew that every two weeks there was a quiz. It was a good way to evaluate yourself, it was not just reading only.

I also liked that I was able to see my progress through the quizzes. You are able to see if you are getting better, to see what level you are on.

As the comments above indicate, the Girls were able to set and self-monitor their relevant academic performance goals, taking steps to meet those goals, and periodically reflect on their actual goal-attainment, building an important skill relating to self-regulation. Further, the periodical reflection due to the quizzes at the end of each module left the Girls inspired and motivated when they performed well. As a Girl expressed, “I was inspired after the results of the first quiz. I saw that I scored a 90 percent and immediately said to myself that I could do better. This day I was so excited that evening that I don’t think I was able to fall asleep. I saw that I really had the ability to succeed in the program. I could be better and try harder. Those that scored higher than me were not necessarily smarter than me. They were more motivated than me. Motivation was key for me to reach the level of where I stand today.”

The findings show that the self-regulated learner assumed increased responsibility for managing their own learning through the process of applying independent effort and adjusting learning goals over time to eventually bring their skills into alignment with grade-level expectations. In addition to the self-regulation, all the Girls also sought additional materials outside the course to enhance their learning (always 33.33 percent, regularly 12.50 percent, sometimes 33.33 percent, rarely 20.83 percent). While the majority referred to online articles or tutorials on youtube, links to outside content were also provided within the modules to emphasize exploration and develop a passion for the subject area. Thereby increasing engagement through deep learning and allowing student agency and autonomy.

Three attempts were provided to complete the InCourse quizzes so that the students could pace their own learning. The survey response indicates that the majority of the Girls (87.50 percent) found the three attempts to complete the in-course online quiz useful. Only 8.33 percent of the Girls were neutral, and 4.17 percent disagreed.

3.3e2 Self-regulation and self-directed learning, ICT Professionals

The lack of ability to regularly track performance negatively affected the self-regulating capability of the ICT professionals. Multiple attempts were appreciated but a more challenging set-up was desired by the students.

Majority of the ICT professionals showed the characteristics of a self-regulated learner: they mentioned the importance of time management and referring to other online courses and articles to enhance their learning.¹⁰ For example, some ICT students mentioned:

It's also a question of personal time management, in regard to completing the reading portions of the modules

I found some information online regarding this topic from different sources.

When there were thing that I did not understand, I would do some research to better help me comprehend.

I did consult other sites for more information. I went on YouTube to watch some videos and used the links that were given to increase my knowledge.

But there was an overall disappointment expressed at the inability to self-regulate their performance. The grades were not posted regularly, and students mentioned taking screenshots of the responses to track their past performance.

I would like if the platform would track our grades on the quizzes. Also, there have been times when I submitted/validated a quiz and I received an error.

In regard to the platform I would like to be able to see my historical quiz performances, if I don't take it upon myself to screenshot the response there is no way to track my past performance.

The quizzes are not scored. It's only you pass or fail. It would be nice to see the percentages, individually and in total/historical. You also can't repeat the quizzes. It would be a good feedback tool if we knew how we scored.

There was also mixed response towards the usefulness of multiple quiz attempts. Almost half of ICT professionals were either neutral (40 percentage) towards or disagreed (9 percentage) with the usefulness of three attempts. For example, some ICT professionals indicated:

While taking the quiz there should be a limit of two attempts.

I do agree that this should be changed. Also, there should be a timer/time limit for the quizzes. You should not have the option to spend two hours on a quiz. The amount of time should be clear and precise.

As the comments indicate, the dissatisfaction was not so much from the ability to take the quiz again but the lack of challenge and difficulty level because of the unlimited time. Students desired a more challenging set-up to better evaluate their performance and abilities.

¹⁰ Most ICT professionals sought additional materials outside the course to enhance their learning (always 21 percent, regularly 23 percent, sometimes 40 percent, rarely 12 percent, never 5 percent)

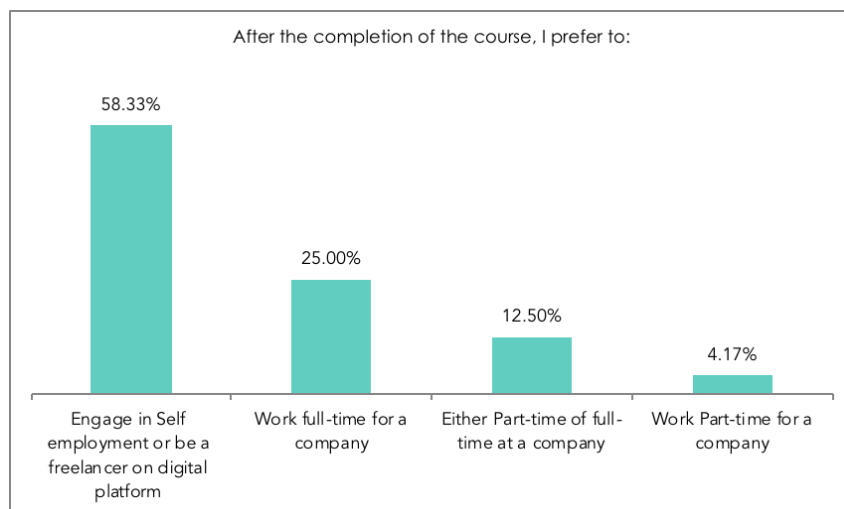
3.4 Employment

The overarching objective of the AGG program is to create enabling conditions for young Haitians to participate in the digital economy. While a major focus of the program is online education to upgrade the skills and meet the infrastructure deficit, a part of the program is also focused on building the capacities of the Girls to successfully join the digital market, both international and domestic. It was also important to understand the expectations of the ICT professionals as it relates to the job market. This section focuses on understanding the aspirations, barriers, and motivation of the Girls and ICT professionals as it relates to employment.

3.4a Job Access Issue: Market Immersion

Majority of the Girls (91.67 percent) agreed to the intent of seeking a job after the completion of the course. Only one student was neutral, and one student disagreed. Further a preference was seen towards freelance or part-time work: more than two thirds of the students selected part-time job (70.83 percent) over full-time-job (16.67 percent) and 12.50 percent were seeking both part-time or full-time opportunities. This was further supported by the fact that 58.33 percent Girls selected self-employment over full-time (25 percent), part-time (4.17 percent), or both full-time and part-time employment (12.50 percent).

Figure – Employment Preference of the Girls (Source: End-Term Evaluation Survey)



Girls preferred freelance and part-time work because of the greater autonomy and flexibility it offered. For some the flexibility with time allowed them to pursue higher education at university or other entrepreneurial activities. For example, some of the Girls stated:

I prefer being a freelancer to be productive as I will be more in my skin.

I like independence.

I like to work in peace.

Because this will allow me to improve my skills and continue my studies, and acquire the means and the experience necessary to become a self-employed worker at the right time

Sometimes we have to work regardless of what we care and want. If you are independent, working without pressure with all your heart in a healthy environment helps achieve better results.

To be more independent and have time for other activities.

Self-employment will be in my favor because I would like to have time to learn more about technology.

I am still a student at the university, I cannot work full time in a company

I just need to work, to finance my studies at the University, I would like to have my degree or even license to do a master's degree.

By working part time, I will have free time for my charitable and entrepreneurial activities.

For those that sought full-time employment, the reason was often that they need to learn more skills and gain more experience before they can engage in self-employment. Some Girls indicated:

Because I'm not yet ready to be independent. I would first learn from others, study the market by working for others, earn enough money to start my own business.

I want to put my skills to the service of a company. And so, I will learn.

Working first in a company will help me gain experience in order to be better able to work.

Because I have to work for a company or other to have the means to set up my own business.

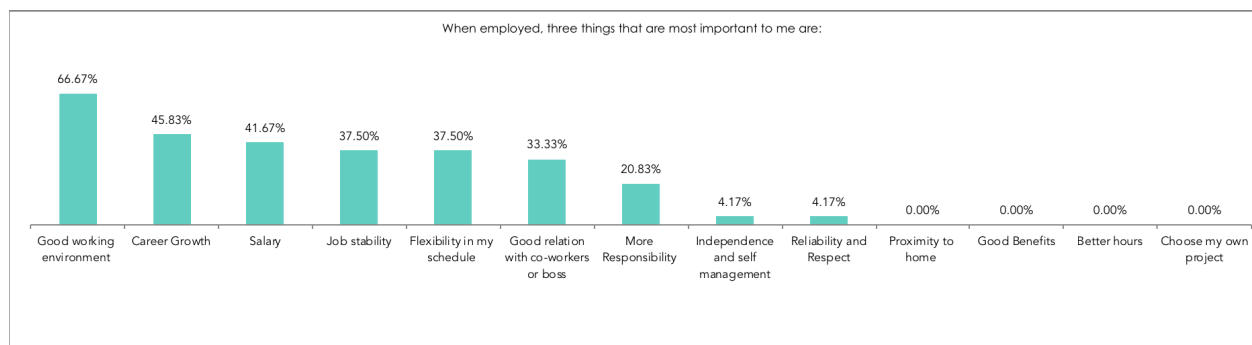
For other Girls, Interim part-time Job was a means to pay bills while they set up their freelancing work:

There are benefits to both options. When doing the freelance work there are certain things that you have to have in place in order to start working effectively. But what you can do is find a "normal" job where you work for six months or so but you are still working towards working on your own/online.

These are things that will allow me to work online. Because I lack these items to start/advance with online work, I can work for an organization in the interim. I can write an objective/plan that will prioritize my goals and plan (6 months, 1 year) to advance.

While looking for a work opportunity, good working environment was the top attribute for Girls (66.67 percent) followed by career growth (45.83 percent), and salary (41.67 percent). More importantly, Girls wanted opportunities where they could learn more and acquire new skills. And they were ready to make sacrifices - traveling far, lower salary - to acquire those new experiences. Salary was seen more as a means to pay for the expenses incurred while doing the job so they do not go into a loss.

Figure – Employment Factors in order of priority as reported by the Girls (Source: End-Term Evaluation Survey)



Also, while most Girls sought freelancing and expressed the need for autonomy and flexibility, the two attributes came much lower down the list. It was more important for the Girls to have a good environment where they are respected.

What is important for me, regardless if it is an online job or in person, is that the manager/boss respects me.

When making a choice, it is not only the salary that is important. You have to think about the institution, what can help you move forward, and what works with your personality.

All of the factors that you listed are important. But what you didn't mention was the acquisition of new experiences. Yes, not having to travel would be good. But if traveling meant I would learn new things I would prefer that.

I think otherwise. If I am learning a lot and really like the work, I would make the sacrifice to keep the job. You never know what tomorrow will bring. The things that I am learning at that low paying job may give me the things I need to attain the better paying job. I would be growing professionally.

Like the others have said acquisition of new skills is very important. You have to make it mutually beneficial (they exploit you and you exploit them). The pay is also very important. If you do not have the means to take care of yourself you will view it as a waste of time. Imagine if you have a job and the money is not enough for me to travel there and back. It is not logical to take a job where you are spending more than you will make. This will leave me with a deficit. Even if I were learning a lot/ acquiring new skills I would have to leave/quit.

I would add that the acquisition of new experiences is important. When you are working in a position there are many new things that you are doing/learning. For example, participating in this program was the acquisition of new skills. Additionally, the work environment is very important. It is difficult to work someplace when you do not feel comfortable. You are not motivated to give it your all. For example, let's say internet is a necessity but if you are not motivated you will not feel compelled to invest in the infrastructure that you need (ie. modem, router) in order to move along.

More importantly, Girls realized that need to instill self-discipline and have a respectful environment to succeed in any working environment, be it full-time employment of freelance work. And that quality of job mattered above salary.

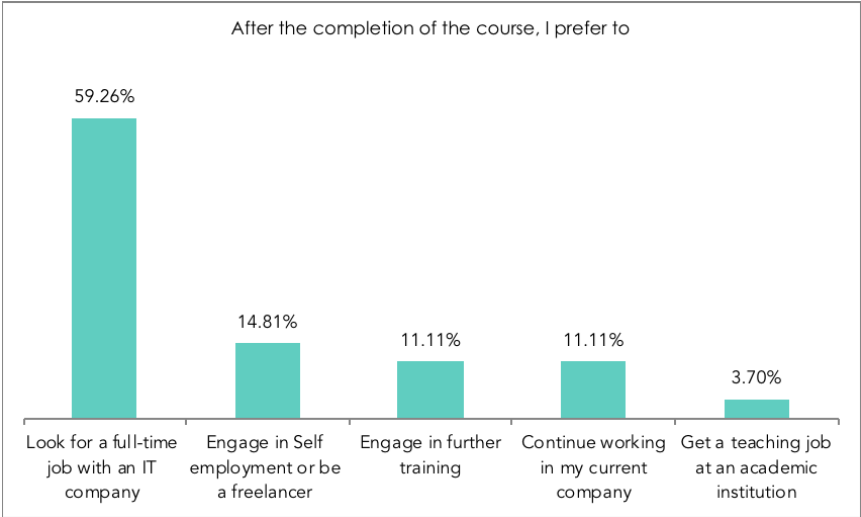
I have no work experience. But when it comes to working, I think it is important to job your job well, do your best. Yes, the other things are important. The salary will be there, but it is important to do your best.

Working for someone else does not mean that you cannot also work on your own/manage your own affairs. Working for a business simply means that you know you will be paid a certain amount on a steady basis for the service you are providing. Freelancing means that you have to instill discipline because of the deadlines. You do not know if your lateness impedes them from taking the next steps on the project. This is a challenge for both of you. In a normal job it is the boss that is pressuring you. In the freelancing it is the client that is pressuring you. These are things that are unavoidable. Also, it is easier to go on your own after working in a certain domain. There are things you will learn only after actually working on them, it is not the same as following a class. On the reverse side it can be a problem because you will discover what resources you lack in order to do it on your own as well.

As a professional you should be prepared/ready to work in all (independent, freelance, etc.). It is a sense of principles and motivation. When I say a private business, it is because see how the public offices (government) work. You can see that they do not prioritize competence. When you go to an office you see people being negligent. But in the private sector, your boss/manager knows that there are many challenges and they need someone capable. It is the quality of employee that is important for them, not the quantity. There are challenges that must be overcome.

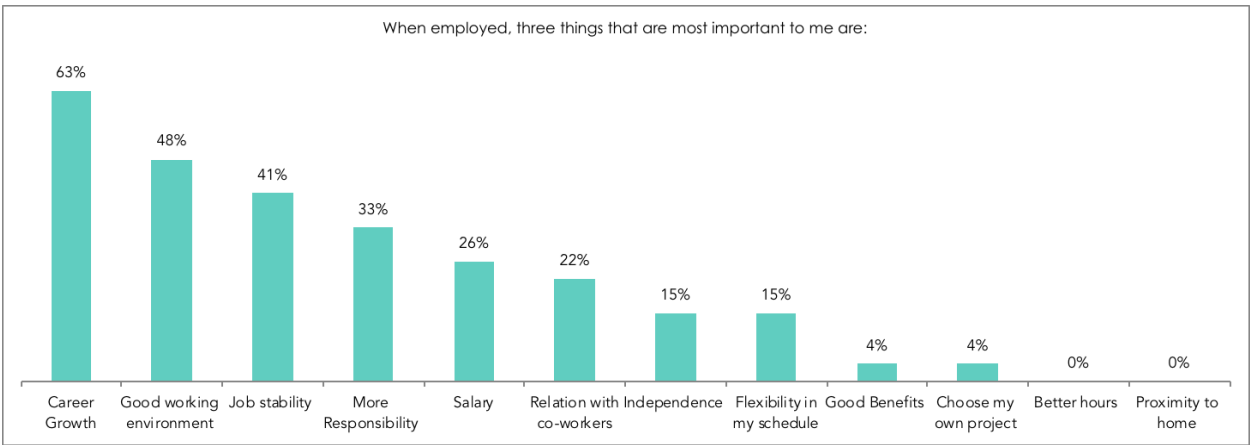
In direct contrast to Girls, majority of the ICT professionals (59.26 percent) preferred full-time employment at an IT company over self-employment (14.81 percent), further training or collaboration with AGG (11.11 percent), continued work at current company (11.11 percent) or teaching job at an academic institution (3.70 percent).

Figure – Employment type preference as reported by the Girls (Source: End-Term Evaluation Survey)



ICT professionals saw more value in career growth (63 percent), good working environment (48 percent), job stability (41 percent), and more responsibilities (33 percent). Salary (26 percent), relation with co-workers, independence (15 percent), and flexibility in schedule (15 percent) made second tier.

Figure – Employment Factors in order of priority as reported by the ICT professionals (Source: End-Term Evaluation Survey)



Similar to Girls, career growth and gaining new experiences to advance the skills learned was the prime motivation:

More responsibility: it would mean for me the possibility to show my abilities and see the work that I can accomplish. It is also a source of motivation. I particularly appreciate the challenge. I worked 10 years in telecommunication. It's the fact of feeling responsible and able to evaluate myself what kept me there for so long in the field.

Salary is a very important part of the job. This allows the worker to meet their needs and to be available to do their job.

I would think the objective is to apply the skills that we learned. For example, I work as a graphic designer, but I would like to find the way/opportunity to implement these skills in my day-to day-tasks, to advance in my field.

Perhaps there are those that can apply these new skills at their current jobs. For me this is not the case. That is why I took it upon myself to see if it was possible for me to pursue this option through the Canadian Embassy. For me this is the next step, I do not even mind if it is unpaid. I am more interested in the experience.

To advance, in my case, I would need an internship/apprenticeship to say I am at 100 percent.

3.4b Job Access Issue: Application of Skills

Both the groups were interested in advancing the skills that they learned through the course by seeking opportunities in the IT sector. While Girls recognized that the digital skills that they have learned open many avenues in the field of IT, most Girls wanted work in the field of data management. For example, some Girls mentioned:

I want to be employed as a data manager of quantitative and qualitative data.

Data management because this was the focus of the training/program.

This knowledge/skill set is polyvalent and applicable in many domains/fields. One can work as a data manager, researcher. If you get a job you can apply many of the skills that we learned.

Most of the ICT professionals anticipated that after the completion of the course they would get a better paid job at a new company (59.26 percent) while the other students felt they would be able to transfer the knowledge to the peers at their workplace (40.74 percent). Few students believed it the skills gained through the course would help them get a promotion at their current company (14.81 percent). For those seeking new jobs, telecommunication was mentioned as the lead sector. The students wanted to be employed at the leading companies within that sector such as Digicel, NatCom, and Conatel.

Telecommunications. I have done so in the past when I worked at the Digicel call center.

I don't really know. I was thinking maybe I can advance with security, but I do not know at what level. I feel like there is a base level of network security that everyone knows. I really don't know. Even now I can't tell you in what sense.

An organization where security is a priority. That is what really interests me.

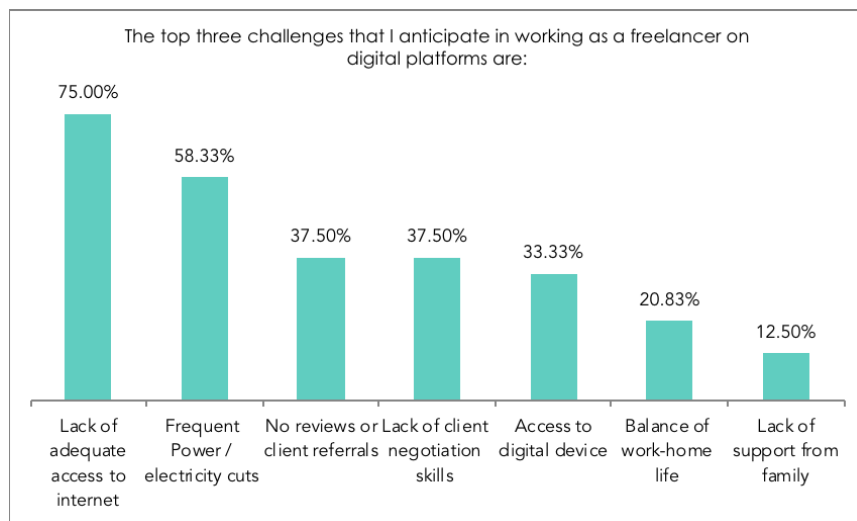
Group consensus telecommunication and ISP #1 Digicel, NatCom, Conatel these are the businesses that are providers here in Haiti. These are also the places where it would have helped to have an internship. It would help cement the skills attained in the course and skills attained throughout my academic studies.

To find post that permits us to practice the skills learned. Assistant/ lead IT or a technical manager.

3.4c Job Access Issue: Skill and Infrastructural Barriers for Girls

The students identified multiple challenges that they faced in accessing work opportunities in the market. With Girls interested in the freelance work, the challenges were primarily infrastructural and related to lack of reliable internet bandwidth and high cost of electricity backup.

Figure – Barriers to independent work as reported by the Girls (Source: End-Term Evaluation Survey)



75 percent selected lack of adequate access to internet and 58.33 percent selected frequent power or electricity cuts. For example, some Girls indicated:

I would say internet would be a problem. You could always get a router to solve that problem.

Also, that the manager/boss provides assistance. For example, provide a computer to use or provide for internet/wifi usage. A payment scheme that allows you to take care of yourself is also important.

These are all important criteria. If I wanted to work online I would need help starting off. The biggest obstacles preventing us from utilizing technology to its potential in Haiti are electricity and internet. The infrastructure needs.

If EdH is not providing the service what are my other options? Can I afford backup tools like a battery so that I can do the work? As I said acquisition of new skills is very important for me. The contractor/boss may be exploiting me/taking advantage in one way, but I am able to exploit them in another way. Is the money/salary important, yes. However, it is not the most important to me.

Not having the funds to commute is very discouraging, but online work has obstacles as well. I cannot rely on EdH (Electricite d'Haiti – electricity provider) while working on online work. The contracting person needs to know that I have the capabilities and discipline to do the work. There are many parameters to consider. If EdH is not providing the service what are my other options? Can I afford backup tools like a battery so that I can do the work? As I said acquisition of new skills is very important for me. The contractor/boss may be exploiting me/taking advantage in one way, but I am able to exploit them in another way. Is the money/salary important, yes. However, it is not the most important to me.

Additionally, you can get an inverter or a battery to ensure you always have electricity so that you can work.

There are also infrastructure needs such as a battery and inverter that I have to budget for.

Also, that the manager/boss provides assistance. For example, provide a computer to use or provide for internet/wifi usage. A payment scheme that allows you to take care of yourself is also important.

Other barriers included lack of reviews or client referrals (37.50 percent), lack of client negotiation skills (37.50 percent), and access to digital device (33.33 percent). The biggest factor with client negotiation skills was the ability to set up payment systems and management of electronic money. For some Girls barriers also include balance of work-home life (20.83 percent) and lack of support from family to pursue freelance work (12.50 percent).

The contracting person needs to know that I have the capabilities and discipline to do the work. There are many parameters to consider.

When it comes to the online work, we have to keep certain things in mind. We have to remember that with online work the boss can be anywhere in the world. We need to learn more about online payments and how to manage electronic currency (bitcoin). How do get around PayPal since you cannot create an account within Haiti.

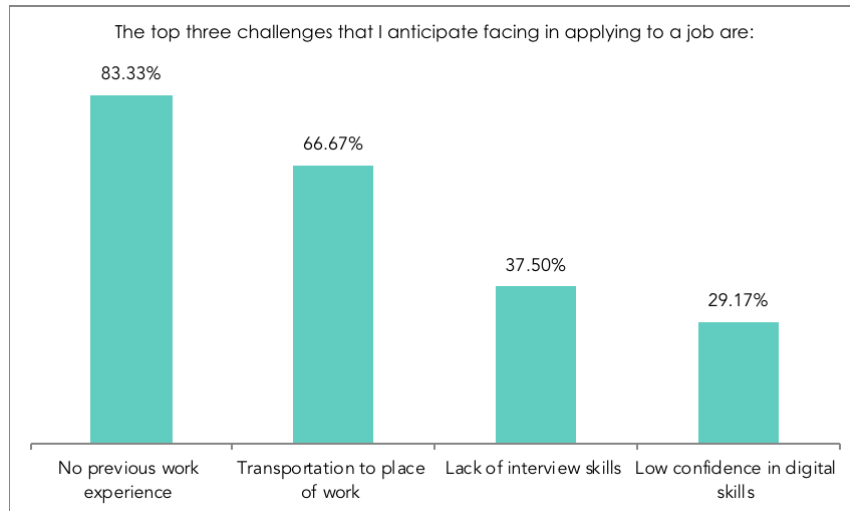
She had someone in the US create an account using the persons banking information. The person would then wire transfer/western union the funds to the woman. It is not her personal account. We really need more information on how to manage these types of problems.

Working online asks for a lot. When you are working online it does not mean that you are working for someone in Haiti. They can be anywhere, it is for the whole world. If I am working for them, I will be paid. But, in order for me to work I need the things that will permit me to do so. I need to know more about electronic payment methods and crypto-currency (bit coin, PayPal, etc).

We are talking a lot about payment. Before you start a job, you usually speak with the boss (i.e. negotiating) to discuss your needs. It is not logical to work as a volunteer. Before you have this talk you need to calculate how much you need to make the job work as an opportunity for you. The employer also realizes that the pay is not the most important, it is your capabilities within the institution and your ability to handle the procedures. When they see your competence they are willing to give it.

Girls who were seeking full-time employment saw lack of experience (83.33 percent) and transportation (66.67 percent) as the biggest barriers.

Figure – Barriers to full time employment as reported by the Girls (Source: End-Term Evaluation Survey)



This was followed by lack of interview skills (37.50 percent) and low confidence in digital skills (29.17 percent) as indicated by the comments below:

I think we need more learning and training. Yes, we still have the learning materials but practice is needed. We need more support in moving forward. For example, this morning we had a woman speak to us about working on different online platform and her challenges. If we wanted to pursue this option, we would need help. We need to know how to do these things.

We would need more practice in order to help in our professional development and competence levels.

I would like to take more classes and advance in the field of technology. I do not know where I would take the classes exactly.

I would like to work in IT, in either the private or public sector. Motivation is internally found, it should not be derived from where you work. I am working in a private business now that operates like a public institution. I look for ways to challenge and develop myself.

I would like to work in the private sector. The private sector presents you with more challenges. When you look at this country the people that work in the public sector put no effort. In the private sector not only do you get paid more but you get to use the skills/apply the skills you learned.

3.5 Performance Issue 1: Achievement of Expected Outcomes

3.5a Enrollment, attrition, and graduation

The program met its benchmark for engagement and had a low attrition rate and high graduation rate.

Enrollment: Despite the limited window time, ESIH received an overwhelmingly high response. 178 applications were received for the Network Management and Security courses, of which 90 applicants were called for an in-person interview. Finally, 50 students were enrolled with 25 each in Security and Network Management courses. 200 applications were received for the Internet and Data Practitioner course. 85 students were called for an in-person interview and 50 students were enrolled in the program. All 100 students joined the program.

The high level of engagement was attributed to three key factors. First, ESIH's local leadership and expertise attracted the right profile of students and facilitators. The digital profile of the students admitted to the internet and data practitioner course varied from basic awareness to relatively proficient in digital competencies. Second, outreach through partner NGOs who expanded the network of the ESIH to reach to students who can benefit from the course. And third, the second screening was conducted through in-person interviews which provided ESIH an opportunity to further establish trust and credibility with the students and provided them a platform to raise any queries or doubts that might be a barrier to joining the program.

Students also appreciated orientation day as it provided them the opportunity to understand the structure of the course and get more familiar with the course facilitators and program partners. All three course delivery partners, COI, ESIH, and LACNIC, on reflection see the orientation to be an opportunity to better prepare students for the technical problems that were encountered during the course. For example, providing students more grounding in the tablet, slack and common applications used for the course such as google drive.

Figure – Enrollment, attrition, and graduation related statistics [Source: Partner Reports]

200	80	50	2	86%
Girls applied to the program	Girls called for an interview	Girls enrolled in the program	Girls dropped out of the course	Girls graduated with a score of 60% and above
178	90	50	2	56%
ICT pros applied to the program	ICT pros called for an interview	ICT pros enrolled in the program	ICT Pros dropped out of the course	ICT Pros graduated from the program

Attrition and Graduation: Of the 100 students who joined the program, 46 ICT professionals and 49 Girls attended the orientation session. Only 2 Girls dropped out due to family problems and 86 percent of the Girls graduated with a score of 60 percent and above. The attrition rate was also low for ICT professionals, only 2 students dropped out and 56% of the students graduated the program. The low attrition rate was mostly attributed to the good relationship between the students and the facilitators. The facilitators constantly followed by and responded timely to any issue faced by the students in the program.

3.5b Engagement of Facilitators

The program met its benchmark for engaging and training qualified facilitators at a ratio of 1:25 for the students of all three programs: Internet and Data Practitioner, Network Management, and Security.

Network Management and Security: Two applications were received for each of the ICT professional courses facilitator job post of which one facilitator was selected and trained, achieving the targeted student to facilitator ratio of 1:25. The selection committee comprised of three members from ESIH and LACNIC. The facilitators received training from the professors in charge of course development the weekend before LACNIC's event in Panama (LACNIC 29). They were invited to participate of the event, receiving training in IPV6 and advance internet security, in addition to course content.

The facilitators were instructed to hold informal communication with students in Haitian Creole and course content was provided in French. Each facilitator was instructed to provide 8 hours of online facilitation per week. For details of the training curriculum of trainers, refer appendix.

Internet and Data Practitioner: Five applications were received for internet and data practitioner facilitator job post of which three facilitators was selected and trained, achieving a student to facilitator ratio of 1:17, a better ratio than the targeted ratio of 1:25. The selection committee comprised of four members from ESIH and LACNIC. The facilitators received training from representatives of COI.

The facilitators were instructed to hold informal communication with students in Haitian Creole and course content was provided in French. Each facilitator was instructed to provide 8 hours of online facilitation and 4 hours of in-person facilitation per week. For details of the training curriculum of trainers, refer appendix.

3.5c Course Development

The program delivered all courses on time but unexpected delay due to translation affected quality assurance of the courses.

The course content was designed by two partners – LACNIC and COI. LACNIC developed and designed the course content for network management and security to be uploaded to Thess in pdf format. Besides the quiz feature and chat forum, no other feature of the Thess was used. COI designed and developed the course for internet and data practitioner. While the course was meant to be uploaded to Thess, to avoid technical problems and due to shortage of time, the course was delivered on ADAPT.

The ADAPT authoring tool enables the combination of text and graphic components on the scrolling page to provide a richer, more interactive and a much more responsive content consumption experience for users, especially those on mobile devices or with poor data connections. It provides a variety of interactive components that allows the course modules to be designed with directed, but flexible learning paths. Using these features, the courses were designed in a consistent format throughout, as short, modular learning content with built-in quizzes and repetitive

learner assessment in line with content. This design facilitated a progressive, directed learning path that allows students to achieve incremental mastery of a concept before moving on to the next.

The specific ADAPT platform features used included:

- Responsive eLearning content to work on any device: Mobile phones, tablets, and desktops
- Ability to be deployed as web courses, as well as stand-alone mobile phone apps that do not require continuous internet connectivity
- Multi-lingual, that enables the student to select between English / French

Network Management and Security: As reported by LACNIC, course content was discussed between the professors selected for its development and technical experts in LACNIC with previous experience in Haiti. The Professors were selected based on their technical knowledge and online learning expertise. They were both recommended by LACNIC's technology area, having worked for LACNIC previously. Each module was reviewed and approved by a LACNIC technician. In addition, for specific topics additional expert advice was sought (ex: Virtualization, Santiago Aggio from Conicet Argentina). Local Facilitators were also involved in the development of the courses. They reviewed the translation, making technical language adjustments and some suggestions regarding content, based on their local teaching experience. LACNIC was satisfied with the inputs received from the experts and no additional research is expected in future.

LACNIC delivered all the 12 modules in time requiring a week of training each. The list of modules can be found in appendix. Course content was developed and uploaded to Thess platform in Pdf format. In addition, the weekly quizzes were programmed using a Thess specific feature. Despite the recommendation of the research group, a significant barrier prevented group activities from being designed for students. Most of the ICT professionals worked full time and it was anticipated that they would struggle to coordinate and dedicate time for group activities. For details of the curriculum refer appendix.

Internet and Data Practitioner: As reported by COI, the courses were delivered on time. But the translation took significant time than previously anticipated, and the delay left no time for quality assurance. As a result, some spell and technical errors were reported by the students. The course was developed in consultation with the students and faculty resources at the University of West Indies and curated with the help of various Open Education Resources available online. Baseline scenarios for the capstone module was developed by COI researcher and the content was informed by Demand Research conducted by the 3x3. The capstone module was written as a business scenario related to a specific target job and required the students to analyze and evaluate issues in a given problem situation, select and apply the appropriate digital tools, and demonstrate previously acquired competencies as well as demonstrate effective critical thinking, problem-solving, and communication relevant to the specific job scenario. For details of the curriculum refer appendix. On the day of the orientation, a baseline digital profile assessment was conducted by COI that helped assess the degree of support required by the students.

3.5d IXP reinforcement and IPv6 support to ISP

The activities for IXP reinforcement and IPV6 support were on track with multiple trainings implemented. It is too soon to comprehend the impact of these activities.

Activities related to IXP reinforcement and IPv6 support to ISP were rolled out during the duration training round 1 to encourage capacity building of local resources through ALCNIC eCampus training. The aim was to help identify internship opportunities for students to practice and apply their knowledge, encourage collaboration with academic institutions in the area, encourage remaining ISPs to join the IXP and pay for the service, and encourage installation of new CDNs.

Two approaches worked well, first the one to one support to ISP and second opening the training to a larger portion of Haitian ICT eco system. But gaps were seen due to budget and time constraints. For example, activities could have included more ISP and there wasn't enough time to secure resources. Also, the implication of the public sector can be reinforced. The detailed activities are mentioned below:

IXP Activities: As reported by Transversal, the outputs of the IXP reinforcement activities from 27 May till 3 June included IXP documentation, server installation, IXP manager deployment for IXP management automation, Proxmox Virtualization Platform Deployment, IXP Service Management Training, best practices for Internet exchange point management. Two local resources were trained on IXP Management best practices and collaboration was fostered between local ISP. Further, introduction to ISOC was conducted to request additional support regarding hardware procurement. Another conference, Internet and IXP in Africa, was held on 31st May 2018 at Montana Hotel. 30 participants attended the conference.

IPv6 Support Activities: The outputs of the IPv6 training, Access Haiti and Haiti data networks, held from 13 May till 17 May included IPv6 prefix announcement, router configuration, DNS configuration, and best practices for deploying IPv6. Another IPv6 training was held from 13 May till 14 May at BANJ. 35 participants attended the training. A conference, Internet and IPv6 in LATAM conference, was held on 15 May 2018 at Banj. 50 participants attended the conference.

Overall, the activities will be continued to ensure the initiative and the local community continue to work hard towards the sustainability of the IXP and that other ISPs deploy IPv6 in their whole network, monitor deployment, and continue to encourage capacity building initiative for local resources.

3.5e Partner Outreach

The partner outreach activity conducted by LACNIC revealed set-up of a new SME to be less impactful than increasing the Girls capacity to target talent platforms.

At the onset of the program, LACNIC had three priorities for partner outreach – Haitian Diaspora, Funders, and partners for setting up a local enterprise through which Girls can be employed for data related jobs. The Haitian Diaspora outreach was aimed to seek employment opportunities and set up an advising diaspora committee that can help reach for more contributions – in kind, employment opportunities and funding. Both the research process and extensive consultation thereafter by LACNIC led to the conclusion that it would not be effective to reach out to Haitian Diaspora. The diaspora works on trust network and usually requires established credibility before members provide employment opportunities. Establishing a Haitian Diaspora member board was stated as non-priority.

The initial meeting with funders revealed that moving conversations past initial introductions is difficult without results of the pilot program. LACNIC plans to resume conversations for grants once the impact of the training round 1 are recorded.

Discussions were initiated with local service providers to set up a SME, but it was concluded to be too complex while not guaranteeing long term employment to graduates. More research and conversations with different enterprises led to cancellation of the plan to set up a SME and the focus shifted to talent platforms. A new employment consultant was hired by IDC and LACNIC. The consultant will be responsible for securing work through brokers on talent platforms and in the local market while simultaneously building capacities of the women to avail these opportunities.

3.6 Performance Issue 2: Demonstration of Efficiency and Economy

While the program had an effective outreach and selection process in place, the process needs to be account for more time and the online application needs to be optimized. Greater coordination is desired between different partners.

ESIH was responsible for the recruitment and selection process. The target enrollment period was February 1st, 2018 till April 30th, 2018. Members from partner organizations – LACNIC and COI – were included in the selection committee along with other IT experts and the facilitators of the courses. This allowed for a more transparent and informed selection, taking into account opinion of all parties involved in the development and delivery of course. The process also provided an opportunity for students and facilitators to meet in person and agree on communication and general course guidelines. The role of the courses in the context of AYITIC was explained, offering students a broader look at the AGG initiative. Involvement of the facilitators promoted their leadership in addition to the development of a relationship with students.

But despite the successful process some points related to the application process were noted that need improvisation:

- **Tight Time Schedule:** All partners involved in the selection committee noted that the time schedule for the selection process was tight. ESIH stated the need for atleast two weeks in the next training rounds for the whole process.
- **Long Online Application:** The online application was lengthy and not well organized. Further coordination between 3x3 and ESIH was recommended to shorten the survey.
- **Senior ICT Professionals:** It was desired by the partners to involve more senior ICT professionals in the selection committee to better adjudicate the candidates.

In addition, better coordination was desired between all partners to formalize the structure of facilitation and completion of monitoring and evaluation related activities.

4. Conclusions and key recommendations of the Evaluation Study

Several factors played into the students to enroll and participate in the AGG program. For Girls, it included the fear of being left behind men in a field that is omnipresent and rising, the hope that the course will connect them to the digital field and technology, gain of basic digital competency or skills that can enhance both their productivity and employability, and a pathway to learn and deepen their knowledge through work in the digital domain. For ICT professionals, the expectations were to increase knowledge in the domain of network management and security, an opportunity to practice and apply different new skills in the domain and go beyond university education, a pathway to upward job mobility, and specialize in a domain.

For most parts, the program successfully met the expectations of the students and benchmarks set in impact evaluation framework. This section discusses the conclusion of various factors discussed in Chapter 3 and provide detailed programmatic recommendations build upon the main findings to support and accentuate the successful elements of the program while making refinements and additions to the elements that desired improvement.

4.1 Outreach and Enrollment

A majority of the applicants heard about the program either through a trusted community-based organization in the current network of ESIH or through participation in prior programs and events of ESIH and LACNIC. While this outreach is important, it showed the problem of potentially missing a viable and desired pool of participants that only had tertiary education for the internet and data practitioner course and more female and younger participants for the ICT courses. Also, scoring matrix for selection should relook at the age criteria incase of ICT professionals where a significant and direct relation was seen between age and performance, older students had lower performance.

Recommendations:

- Leveraging existing relations with community-based organizations to better achieve the target profile set for the program, specifically more participation from Girls who only had tertiary education;
- Increase female participation in ICT group;
- Relook at age as a criteria for ICT students as a significant negative relation was seen between the performance and increasing age of the students. Older students also tend to have more work and marital responsibilities that also show significant relation with low performance.

4.2 Orientation

Most students valued the orientation session because it set clearly the objective of the program and provided an opportunity to initiate relation and warm up to the facilitators. But several factors were missing. Students require a walkthrough of the online platform and introduction to the communication channels and apps used. It also provides

an opportunity to instruct students on soft skills like time management that seem intrinsic to the successful completion of the program.

Recommendations:

- During the orientation, students should be instructed on how to manage time and better handle time between household, work, and education. Time management instruction should be separate for male and females;
- Apart from time management, instructions should also be provided on the management of online courses and resources, apps, and communication channels. A walk through should be provided through the digital platform and students should be forewarned about the problems related to downloading of apps and other course related resources and materials.
- Attempt should be made during the orientation to bring students with extremely low digital literacy to a minimum digital literacy profile required for the course;

4.3 Course Technology

THESS has an Automated Participation Evaluation System in pipeline to enable tracking of grades and pushing notifications to mobile and desktops. But the system would be developed within the lifetime of the pilot program. Alternative solutions must be sought as grade tracking and notification was reported to have significant influence on the self-direction and motivation of the students. It also helped students monitor their performance. In addition, technical difficulties experienced in the first training round should be removed.

Recommendations:

- A quality assurance must be conducted to get rid of technical difficulties and syntax errors;
- Students should be able to track grades, receive deadline and quiz notifications. Facilitators should provide a comparative table asap post the quizzes for students to track their performance and communication channels should be used for reminders and notifications related to deadlines and quizzes. An integration of slack or WhatsApp to the technology platform can also be considered.

4.4 Socio-Economic and Infrastructural Barriers

A strong relation was seen between the socio-economic background and infrastructural barriers. Low income background made access to power backup, a more expensive and high-speed bandwidth, and private vehicle difficult. Market doesn't offer more affordable options of transportation, power, and internet that could work efficiently for the program. This presents a significant barrier for greater impact and scaling of the program. The program should determine solutions to

Recommendations:

- A dedicated lab space with reliable power back up and internet access should be provided to overcome infrastructural barriers and encourage peer interactions.
- Partnerships with community-based organizations or local NGOs could be considered for providing facilities for weekly practice through PAP area;

- Travel provision for distant areas can be considered for quizzes and meetings with the facilitators. Alternatively, the provisions can also be combined with transport that might be considered for girls than will be trained in freelancing work;
- Additional battery back up for tablets or printed version of course material might be provided to use in case of power cuts

4.5 Pedagogical Barriers

Students appreciated the course content for providing new found knowledge and novel content. They also appreciated the presentation of the course content and felt it was explicit, well presented, and well-defined. They appreciated the modules and quizzes were always available on time and facilitators were dedicated and always ready to help. Areas of difficulties have been discussed in detail in Chapter 3 and identified under each course.

Recommendations:

- More time and facilitation should be provided for difficult content either through increase of duration of the module or provision of learning tools or in-person practice sessions.
- Scenario based exercises should be incorporated in the network management and security courses
- Data and Capstone project module should be provided more practice sessions and facilitation support.
- ICT Pro students should have 1-2 in-person session to provide them the ability to discuss the course content with the facilitators and peers.
- For ICT pro students, the level of quizzes should be made slightly more difficult and questions should prompt them to reflect and be critical
- The final exam of the students can be digital instead of print

4.6 Community

Many students from all three courses expressed interest in being recruited as facilitators for the next training round or contributing to the program through recruitment of students or providing mentorship to students. The program can invest in building an alumni community to encourage a sense of community and increase the chances of referrals, job opportunities, mentorship, and peer support.

4.7 Summary

Students took the online course for a number of reasons varying from the rise of digital economy and closing the digital gender divide in the labor participation to gaining employability skills and increased access to jobs and internship. Several factors influence their experience, some of which students control and some of which are systematic barriers that requires an enabling action.

Facilitators have already successfully managed to establish presence in the absence of physical copresence and worked to build relationships with students and create a sense of community. The courses less some difficulties have been engaging and effective in their course content. But the successful factors of the program need to be balanced with multiple other factors. Students have to balance work and family, to manage time, and to make a personal commitment. Creative and strategic solutions need to be created to mitigate the infrastructural barriers. More meaningful learning experiences need to be developed through scenario-based practice sessions. And the impact and reach of the program need to be broadened by leveraging relations with community-based programs.

Further for training round 2, a better understanding of the enabling factors that affect the cost benefit of the program and can impact scaling-up of the program need to be tested. While the study of training round 1 clearly established the importance of in-person component of learning facilitation, it also indicated contradictory evidence that showed barriers – access to transportation, employment, and household related responsibilities, that make it difficult for students to attend these sessions. Evidence should be gathered in training round 2 to understand which of the two barriers – (1) transportation and responsibilities or (2) internet access and lack of in-person group interaction – have more effect on the performance of the students.